Minnesota Plant Press

The Minnesota Native Plant Society Newsletter

The Minnesota Native Plant Society – *A non-profit organization dedicated to the conservation and appreciation of Minnesota's native plants and plant communities* through education *and public awareness.*

Volume 40 Number 1 **April 2025**

Snow White & the Dwarfs

by Stephen Saupe

The recent controversy about the new Disney live-action version of "Snow White" has reminded me how much I wish I had a magic mirror. Unlike Snow White's stepmother, I wouldn't care who was the most beautiful person. But just imagine what you could learn with a magic mirror! "Mirror, mirror, on the wall. Which plant is the fairest one of all?"

I'd be willing to bet that the mirror's answer would have been dwarf, or snow, trillium (*Trillium nivale*).

Much like Snow White's seven companions, snow trilliums are rather diminutive. In fact, they are the smallest of the trilliums, growing about 4-5 inches tall (see **Figures 2** & **3**).

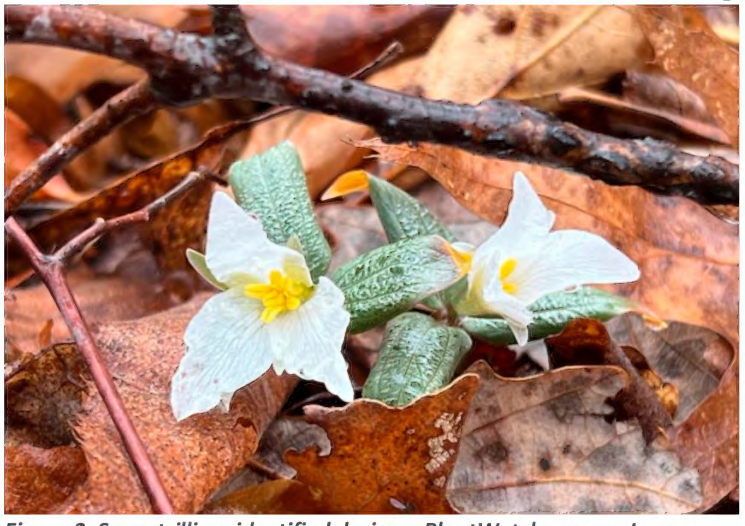

Figure 2. Snow trillium identified during a PlantWatch survey. Image courtesy S. Saupe.

Snow White gets her name, in part, from her milky complexion. In contrast, snow trilliums are named for their amazing ability to emerge through the snow, and then flower when the ground is still partly frozen or barely thawed.

Snow trillium is one of the earliest blooming spring ephemerals. A quick check of records from the Bell Museum *Biodiversity Atlas* shows that it is not uncommon for them to flower as early as April 1st!

How can these plants grow in such cold conditions? At first glance, snow trilliums seem to lack any specialized adaptations for cold survival such as a prolific covering of hairs like in Pasqueflower (*Anemone patens* var. *multifda*). Interestingly, there is speculation that snow trillium may, as do Snow White, her dwarf friends, and homeotherms in general, make its own heat.

Figure 1. Franz Jüttner (1865–1925): Illustration from Sneewittchen, Scholz' Künstler-Bilderbücher, Mainz 1905. From Wikipedia, in the Public Domain.

This may expl-ain why the snow melts around the plants making them appear to grow in a shallow well. By itself, this is not particularly good evidence for having a heat source, since the same phenomenon occurs around rocks or trees in a snowy forest. These objects absorb sunlight and then re-irradiate the energy as heat, which melts the surrounding snow.

However, Andrews (1921) excavated plants under the snow and observed a dome-shaped space above them. This certainly suggests that perhaps the warmth was generated by the plants themselves.

Whether snow trillium produces its own heat is still not clear. However, this remarkable ability does occur in other plants. For example, the spadix (fleshy flower stalk) of skunk cabbage (*Symplocarpus foetidus*), another early bloomer, can reach

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The *Minnesota Plant Press* is the newsletter of the Minnesota Native Plant Society. The newsletter is published quarterly, in January, April, July, and October. The deadline for contributions, which are welcome, is the first day of the publication month. Send articles, photos, suggestions, etc. to the co-editors, Brian Johnson & Steve Saupe at editors@mnnps.org. The Society officers are listed below:

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temperatures of 15 – 35 °C above ambient levels (Knutson, 1974). The heat is a byproduct of a special metabolic pathway, cyanide resistant respiration, that metabolizes sugars to generate heat, much like burning a log in a fireplace.

If you want to see a snow trillium, head to the southern half of Minnesota. They prefer mesic hardwoods areas along the Minnesota and Mississippi Rivers. According to the *Flora of North America* (Vol 26), "*Trillium nivale* occurs primarily at the southern edge of Pleistocene glaciation and shuns humus, leaf deposits, and much plant competition."

Unfortunately, they are relatively uncommon and were listed in Minnesota as a species of special concern in 1984. Like many woodland plants, snow trillium is threatened by habitat loss and invasive species including European buckthorn, garlic mustard, white-tailed deer, and earthworms.

By the time you receive this newsletter, there should still be time to take a field trip to find some of these amazing little plants in bloom. And don't be surprised if, on your drive home, you find yourself singing, "Heigh ho, heigh ho, it's home from work we go."

Figure 3. Snow trilliums growing near Mankato on April 2, 2024. Images courtesy S. Saupe.

The Plant Press Returns

This spring, perhaps after one too many hard ciders, Steve Saupe and Brian Johnson decided to resurrect the *Plant Press* newsletter of the MN Native Plant Society. They both recently retired after a combined 80 years of teaching at St. John's University and the College of St. Benedict, with Steve in the biology department and Brian in the chemistry department.

In addition to teaching botany courses, Steve manages the CSBSJU Herbarium and is involved with the St. John's maple syruping operation

Brian is an amateur botanist who has volunteered with the DNR and is also the president of the St. Cloud Chapter of Wild Ones, a national organization dedicated to the use of native plants in landscaping. Both of them are enthusiastic (***cont'd p. 3***)

members of *PlantWatch*.

Steve and Brian want to emphasize that while they are the editors, it is really YOUR newsletter. Please contact them with your comments, story ideas, or even better, your contributions. For example, anyone who has a favorite site to visit could submit a Destination Botany article. We look forward to hearing from you!

In order for this to be a sustainable and useful publication, your contributions will be vital. Please submit items for publication (editors@mnnps.org). Here is some information that will help the process work smoothly. You may wish to save this document for future reference.

1. We plan to publish in January, April, July and October. We are aiming to send out the electronic version of the document on about the 15th of each month. If you would like to submit something, please send it to us (editors@mnnps.org) by the first of the publication month to allow time to prepare the newsletter.

2. Submissions of any length will be appreciated! Think of a full-length article as being 500-1000 words, but shorter ones are great, too. Send the submission as a Word document. Feel free to include 1-3 figures (pictures, maps, graphs, etc.). Each should have a short descriptive caption and any credits as applicable.

3. Here are some possible ideas for stories. Hopefully one or more of these will resonate with you!
   a) Describe a favorite place to botanize.
   b) Describe a plant or an unusual plant characteristic.
   c) Describe a new discovery or result from the field. (Some of these might be either similar to or summaries of the DNR Biodiversity Highlights presentations.)
   d) Are there any legislative, political or other issues that will be of interest to our members?
   e) Do you have any field /research projects or other professional projects that might be of interest to our members? (Projects need not be complete or of professional publication level to be published here.)
   f) A summary of a professional journal article that might be of interest to the general readership.
   g) Are there any new books of interest to our readership? Articles published by members? Awards to members or to others in our area that are relevant?
   h) Other???

We welcome your submissions, comments on the publication or willingness to help with some aspect of this project. Contact us at editors@mnnps.org. We look forward to hearing from you.

Figure 4. Co-editors Steve Saupe (left) and Brian Johnson preparing for a day in the field with PlantWatch. Image courtesy Deanna Leigh.

President's Column – *Exposure, Experience, and Inspiration*

by Scott A. Milburn

It's a given that all members of the Minnesota Native Plant Society developed an interest or passion for plants through some past experience. This could have been by means of a visit to a museum, an influential instructor, or simply being outdoors. We all likely have shared values regarding conservation and the environment. I think that it is important for each of us to reflect on what that past experience was and how those experiences may not be possible for many in our society. I reflect back on my own experience, owing much of my conservation mindset to my high school French teacher. Although the focus of the class was on learning nouns and verb conjugation, there was an exterior discussion where my instructor touched upon various issues such as water and energy conservation. This was also a period where the news of the day focused on the Exxon Valdez disaster, ozone depletion, and the catastrophic fires at Yellowstone National Park. The (**continued p. 4**)

(*President's column continued from p. 3*) culmination of these experiences and events directed me towards having a strong interest in conservation and ultimately resulted in a career focused on native plants.

Had it not been for that one teacher, I likely would have had a far different trajectory in life. That makes me ponder if kids today will be in a position to have similar exposure or experiences that, at minimum, make them conservation-minded. There appears to be a greater disconnect today from the environment, with too much exposure to social media, fueling consumerism and other negative issues. We are also at a critical point in time where we all need to step up and contribute back to society. I often think of President Kennedy's well-referenced inaugural address in 1961, where he said so famously, "And so, my fellow Americans: ask not what your country can do for you--ask what you can do for your country." It was a call for all of society to do its part to work towards peace. But, I also see these words as a call for personal service for the betterment of mankind. With that said, each of us can make a difference if we act. And cumulatively, we can have a much greater impact on society and perhaps be that person who sparks that interest for someone else.

With all that said, this is a good reminder that we are an all-volunteer organization dedicated to the conservation and appreciation of Minnesota's native plants and plant communities through education and public awareness. I would like to both highlight and thank Brian Johnson and Stephen Saupe for stepping up and taking on the role of co-editors of our newsletter, the *Plant Press*. It has been a number of years since we had an official editor, the last being Gerry Drewry, who served in the position for years. Gerry Drewry was a very inspirational person, having a career in print journalism as well as serving as former Governor Jessie Ventura's campaign spokeswoman. In keeping with tradition, the format in general is very similar to what Gerry originally established.

Speaking of volunteering, we are seeking your involvement as well. This can be as simple as speaker ideas, leading field trips around the state, or taking writing to your state representatives in support of native plants and plant communities.

Minnesota Wildflowers Plant of the Month: *Lomatium orientale*

by ***Katy Chayka, MN Wildflowers (www.mnwildflowers.org)***

Family: Apiaceae (carrot)
Common names: Oriental desert parsley, Salt-and-pepper, Northern Idaho biscuitroot
Life cycle Perennial
Plant height: 4 to 8 inches
Bloom season: April-May
Habitat: Open prairie and rock outcrops

Figure 5. Lomatium orientale. © Katy Chayka. Used with permission. More images available at https://www.minnesotawildflowers.info/flower/northern-idaho-biscuitroot

Chayka – Plant of the Month (*continued*)

Plant Description

Flowers: Flowers are in a flat to dome-shaped cluster (umbel), 2/3 to 1+ inches (1.6 to 3 cm) diameter, at the tip of a long, finely hairy stalk arising from a leaf axil, each umbel made up of 4 to 16+ smaller clusters (umbellets), each umbellet tightly packed with up to 30 tiny flowers. Flowers have 5 white to pinkish petals that are tightly curled in to the center, and 5 longer stamens protruding from the center tipped with white to deep purplish-pink anthers. At the base of each cluster are usually 4 to 10 hairless, lance-linear bracts up to 1/6 inch (1.5 to 4 mm) long, though bracts may be absent altogether.

Leaves and stem: Leaves are mostly basal, forming an irregular rosette, sometimes with a single stem leaf sheathing the stem. Leaves are lanceolate to egg-shaped in outline, 1 to 4+ inches (2.5 to 11 cm) long, 3/8 to 2¾ inches (1 to 7 cm) wide, 2- or 3-times compound, the leaflets divided into narrow segments creating a lacy, fern-like appearance. Color is blue-green to gray-green from fine, soft hairs. Stems are short, spreading to ascending to erect, covered in fine, soft hairs and often tinged purple.

Figure 6. rock outcrop habitat, taken at Morton Outcrop SNA in Renville County. © Peter M. Dziuk. Used with permission.

Fruit: The umbels can expand to nearly twice their flowering width as fruit develops. Fruit is a dry seed, up to ~3/8 inch (5 to 10 mm) long, compressed oval-elliptic, with a few distinct ribs and a pale wing .6 to 1.6 mm wide all along the outer edge.

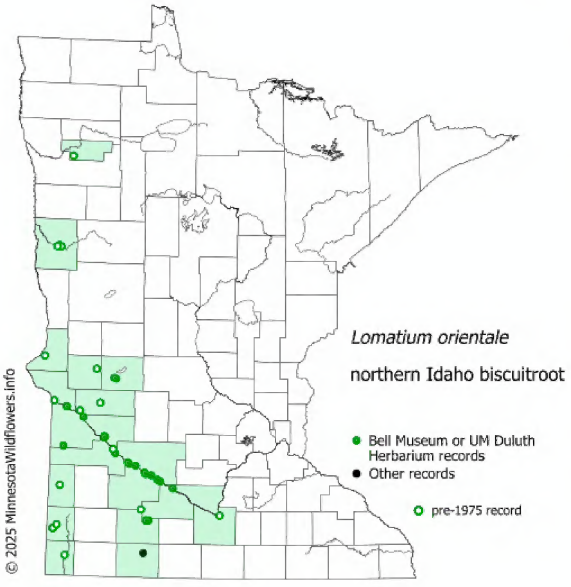

Figure 7. Minnesota county distribution map © Minnesota Wildflowers Information. Used with permission

Notes

Lomatium orientale is widespread in the Great Plains and reaches the eastern edge of its range in Minnesota, with most populations concentrated in or near the Minnesota River Valley. The first collection in the state was in 1890 from a prairie near Appleton in Swift County. While not considered rare here, it is by no means common as it is found only in dry prairie and rock outcrop habitats, which have diminished greatly in both quantity and quality due to agriculture, fire suppression, invasive species and gravel mining. Even where it is known to exist, it is often missed due to its very early flowering period, after which it quickly sets seed and goes dormant for the season, well before most hikers and plant explorers are out and about in the field. I consider it a true harbinger of spring, even beating Pasqueflower to the punch. And as one of the earliest spring bloomers on the prairie, it is an important food source for pollinators emerging from their winter slumber.

According to the Native American Ethnobotany Database (naeb.brit.org), the roots were eaten by the Lakota and Navajo, and the Cheyenne used roots and leaves to treat various gastrointestinal conditions and ailments.

Minnesota Wildflowers Website:
https://www.minnesotawildflowes.info

Destination Botany: Bonanza Prairie SNA

By Brian Johnson

Located on the "bump" on the western border of Minnesota, Bonanza Prairie SNA is an example of a gravel hill prairie. It is adjacent to the Bonanza unit of Big Stone State Park, and consists of 115 acres of prairie interspersed with ravines of oak savanna. The climb to the top of the hill yields a sweeping view of Big Stone Lake, a 26-mile-long body of water formed by the draining of glacial Lake Agassiz and serving as the headwaters of the Minnesota River (**Figure 8**).

Figure 8. The view of Big Stone Lake from the SNA. ©Kelly Randall. Used with permission.

A visit to Bonanza Prairie is enjoyable at any time of year. In the late spring or early summer, the hoary puccoon, white beard tongue, prairie turnip and bearded birdfoot violet will catch your eye. An array of asters, goldenrods, and sunflowers will be your reward in late summer. Rare or unusual plants at the site include the Missouri milk-vetch, slender milk-vetch, and prairie moonwort, although it will take an eagle eye (and luck) to find them. The plant list on the DNR's webpage for this SNA was updated in 2024, so you can use it to get a more complete idea of what you might see there. You might want to be on your toes during your visit—there are some fallen logs as part of management near the intersections of the prairie and ravines that can make walking difficult, as well as some poison ivy.

Figure 9. Liatris aspera. ©Kelly Randall. Used with permission.

Bonanza Prairie SNA was the site of a *Bioblitz* in August 2024. Despite temperatures approaching the mid-nineties with high humidity, a group of more than twenty locals, master naturalists, and DNR personnel gathered for the event. In addition to the botanical group led by Fred Harris, there were birders and a spider team. Kyle Johnson of the DNR also searched for butterflies and moths, although they were hard to find, possibly due to the weather.

If you do make a trip out to western Minnesota to visit the Bonanza Prairie SNA, plan to extend your stay by stopping at other sites of botanical interest in the area. The Clinton Prairie SNA is a mesic blacksoil prairie which produces a nice display of white camas, Carolina delphinium and downy gentian. In the Big Stone National Wildlife Refuge there is an excellent hiking trail that meanders through rocky outcrops, which are home to a number of rare plants. Finally, to the south is Yellow Bank Hills SNA, which contains populations of listed plants including the yellow prairie violet, Missouri milk-vetch, and cutleaf ironplant. Enjoy your trip to western Minnesota!

MN DNR Scientific & Natural Areas Website:
https://www.dnr.state.mn.us/snas/index.html

Summary of the April Meeting Talk: *A Dozen "Charming" Minnesota Plants*

by *Stephen Saupe*

Alexius Hoffmann, OSB, a monk at Saint John's Abbey (Collegeville, MN), wrote: "A state as far north as Minnesota might be supposed to be unfavorable to the development of a fascinating flora – yet even this corner of "God's country" has its charms, modest though they be when compared with other countries" (*Natural History of Collegeville*, 1934). This is one of my favorite quotes and was the inspiration for the plant stories that I shared at the April 2025 meeting. What follows is a brief summary of the presentation that featured a dozen plant stories that I think are especially "charming."

1. **Anachronistic Plants** – Consider honey locust (*Gleditsia triacanthos*) and Kentucky coffee tree (*Gymnocladus dioica*). If you look around the base of these trees in the autumn there is usually a heap of pods. Though a few squirrels, deer or rabbits may disperse the fruits, these species appear to be good examples of plants whose natural dispersal agent, is now extinct. They are considered to be 'botanical anachronisms,' of which there are many other examples including ginkgo and avocado.

2. **Jack-in-the-pulpit** (*Arisaema triphyllum*) – Like European buckthorn and hemp, these plants are dioecious, meaning there are separate male (Jack's) and female (Jill's) plants. The coolest thing is that the type of flowers is determined by the growth conditions of the previous season. For example, a good growing season results in a large corm which yields female flowers. Jack-in-the-pulpit is also poisonous. Like many aroids, including skunk cabbage, wild calla, and many house-plants, they embed needle-like crystals, called raphides, in their tissues making a very irritating meal for an herbivore.

3. **Strawberries** (*Fragaria virginiana*) – A common misconception is that "strawberry is the only fruit with the seeds on the outside." The reason that this is false is because each "seed" is actually a separate botanical fruit that contains a single seed. A strawberry is an example of an aggregate fruit that is derived from a flower with multiple pistils.

4. **Shepherd's purse** (*Capsella bursa-pastoris*) – is named for the shape of the fruit which is reminiscent of the scrotal sac of a sheep. Frugal shepherd's presumably made purses from the abundance of raw materials after castration season. There is a suggestion (probably false) that the seeds, which release mucilage when wetted, may be carnivorous.

5. **Tamarack** (*Larix laricina*) – As we know from Welby Smith's outstanding book, *Trees of Minnesota*, tamarack was the most common tree in Minnesota at the time of settlement. This was learned by studying the land survey records from the 1850's and onward.

6. **Quaking aspen** (*Populus tremuloides*) – This is now the most common tree in Minnesota. It's a shame that the leaves of this tree are not featured in the design for the new Minnesota flag because these trees are found in every county and the leaves flutter like a flag in the slightest breeze due to their flattened petiole. Did you ever wonder why a cloth flag frays but the leaves of quaking aspen and other trees don't? That's because the leaf cells are glued together with pectins more tightly than the woven fibers of a flag, a waxy cuticle surrounds the leaf, and because leaves will deform in high winds into shapes with less drag.

7. **White snakeroot** (*Ageratina altissima*) – This plant produces a poison that passes into the milk of a cow that eats it. Drinking tainted milk killed many settlers in the Midwest during the westward expansion. Nancy Hanks Lincoln, Abe's mother and a distant relative of actor Tom Hanks, was among the victims of milk sickness.

(continued p 8)

Figure 10. Fr. Alexius Hoffmann, OSB., author of Natural History of Collegeville. Image courtesy Saint John's Abbey Archives.

8. **Wild leeks** (*Allium tricoccum*) – Did you know that Chicago is named after the Native American word for "skunk," referring to the garlic-odor of these plants that grew abundantly on the southern side of Lake Michigan?

9. **Rusty woodsia** (*Woodsia ilvensis*) – When moisture is available, these ferns of rocky outcrops grow happily. However, during a drought, the plants dry up and show no signs of life. However, once moisture is again available, they will green-up and spring back to life, which makes them an example of a resurrection plant. Other species that possess this remarkable ability include baker's yeast and the fairy ring mushroom (*Marasmius oreades*).

10. **Hog peanut** (*Amphicarpaea bracteata*) – Above ground, this amazing plant produces "normal," pea-like flowers that develop into small legumes. However, hog peanut also produces underground, cleistogamous flowers. These flowers, which never open for pollination, produce single-seeded pods that look like a garbanzo bean. The proportion of above and below ground flowers is determined by the growth conditions – the more sun the great number of above-ground flowers that set fruit.

11. **Plants with Binary Weapons** – About 10% of all plants produce cyanogenic glycosides which are a type of binary weapon. They are non-toxic until mixed with a digestive enzyme that causes them to release hydrogen cyanide. To avoid poisoning themselves, plants store the toxins in one part of the cell and the digestive enzymes in a different place. The two are mixed when a hungry herbivore takes a bite.

12. **Mayapple** (*Podophyllum peltatum*) – Though the ripe fruits are reported to be edible, be cautious because all other parts of the plant, including the unripe fruits, contain podophyllotoxin which is a potent cell division inhibitor which is used to 'chemically" burn-off warts. The sap can cause serious burns if you are not careful when handling the plant.

These plants are just a small sample of Minnesota "charmers." Would any of these make your list of favorite Minnesota stories?

Notes from the Herbarium

by Tim Whitfeld *(Collections Manager of the Bell Museum Herbarium at the University of Minnesota)*

Not everyone knows that on the 8th floor of the Biological Sciences building on the St. Paul campus of the University of Minnesota there are nearly 1 million dried plant, fungi, lichen, bryophyte, and algae specimens. These are the collections of the University of Minnesota's Herbarium, a library of botanical diversity that has been in existence since 1875.

Originally, the collection was in the Department of Botany, but in 1996 it became part of the part of the Bell Museum, which itself came into existence as the result of legislation enacted by the State of Minnesota on February 20, 1872. The law that passed on that date mandated the University to initiate the Minnesota Geological and Natural History Survey and to preserve the resulting specimens (plants, animals, rocks, soils, fossils) for "public inspection, free of cost, in the University of Minnesota, in rooms convenient of access and properly warmed, lighted, ventilated and furnished, and in charge of a proper scientific curator."

To carry out the provisions of this act, the legislature appropriated an annual sum

Figure 11. Example of a range map for black spruce that can be generated from the Bell Museum Biodiversity Atlas. Image courtesy of Tim Whitfeld.

of $1,000. Despite not always being "properly warmed" the Herbarium has grown in leaps and bounds from the initial tranche of state survey specimens. Our leather-bound ledger records the first major acquisition in 1888 (aside from the State Survey specimens) of six thousand specimens from the Rocky Mountain states collected by John Sandberg, many from areas that later became National Parks. For this collection, the University paid $500, a significant investment for the time. It was Conway MacMillan who made this purchase after he was hired by the University to instruct botany, collect specimens for the Survey, and be the mandated "proper scientific curator" to oversee the Herbarium.

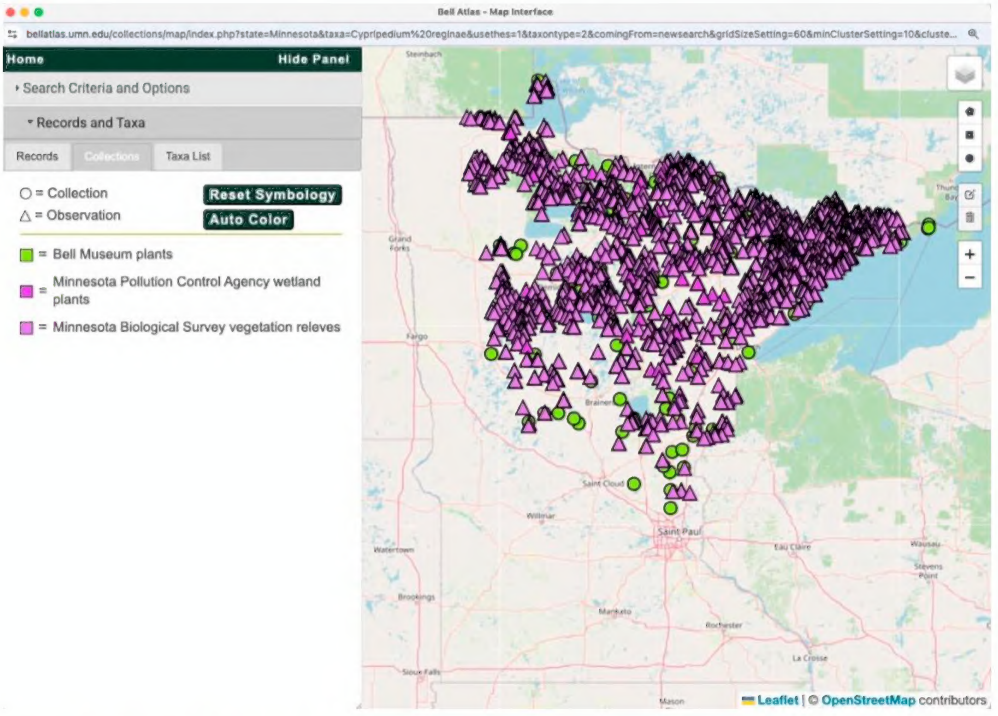

Figure 12. Example of a range map for black spruce. Each point indicates an expert observation (purple triangles) or herbarium specimen (green circles). Image courtesy Tim Whitfeld.

By 1914, the collection had expanded to around four hundred thousand specimens and become global in extent. Since then, faculty, staff, students, external researchers, and state and federal agencies have continued to add new collections from Minnesota, North America, and across the world. Collections from Minnesota alone now stand at around 270,000 specimens. We have specimens of algae (~5,000) bryophytes (7,818), fungi (16,274), lichens (38,351), and vascular plants (206,132) from all 87 of Minnesota's counties, dating from the early 1800s to the pre-sent day. Since 1987, many of these local collections were made by botanists working for the Minnesota Biological Survey, a unit within the Minnesota Department of Natural Resources.

Where the first Geological and Natural History Survey was motivated by inventory, primarily for the purpose of resource extraction, this second round of biological surveys, over 100 years later, was driven by a need for the conservation of dwindling biodiversity. From the perspective of the Herbarium, the Minnesota Biological Survey has increased local collecting efforts such that we can boast a strong collection of late 20th and early 21st century specimens to complement our 19th and early 20th century specimens. This is not always the case in other herbaria. Natural history collecting began to peter out following the molecular biology revolution in the 1950s and 60's so more recent decades are often poorly represented. Thanks to the Minnesota Biological Survey and hundreds of other collectors over the past two centuries, the Bell Museum's Herbarium has a decade-by-decade documentation of our state's botanical diversity for tracking species' distributions, documenting introduced plants, investigating changes to plant's life cycles, and recording environmental pollution through time. Scientific collections provide an opportunity for time travel by allowing us to access data from the past as a point of comparison for the present. Furthermore, the collections are important for taxonomy and classification, they pro-vide data for studies of evolution, and are a reference for identification.

An exciting development across the world of scientific collections is the ongoing effort to digitize specimens and make them available online. This opens up access to a much wider audience and allows people who may not be able to visit the collections in person to see and study specimens online. Over the past two decades, natural history collections across the world have been involved in this effort and millions of specimen records are available on data aggregator sites such as idigbio.org and gbif.org. Interestingly, a former curator of lichens at the Bell Museum (Clifford Wetmore) was a pioneer in this regard. In the 1970s, Dr. Wetmore began digitizing the University of Minnesota lichen collections on punch cards. These data have been carried forward

through various technological innovations and are still in use today in the Minnesota Biodiversity Atlas (https://bellatlas.umn.edu/).

The Biodiversity Atlas began in 2016 with support from Minnesota's Environment and Natural Resources Trust Fund (ENRTF). Initially, the Atlas included only specimens from the Bell Museum's collections (plants and animals) but additional support from the ENRTF has allowed us to expand and include collections from other Minnesota academic institutions, museums, and state agencies. There are now have over two million records in the *Atlas* with more added every day.

Our goal is to make the Atlas a one-stop-shop for anyone interested in Minnesota's biodiversity. Specimen data and images are available on the site and can be searched by date, locality, species name, or collector. It's possible to compile checklists for a particular county if you'd like to know what plants or animals have been documented in your area and maps can be generated with points showing records of a particular species across the entire state. There are many ways to query and slice the data for use in the classroom, the lab, or for conservation and management. It's also available for general users who would simply like to know more about the natural world in Minnesota. Most importantly, we are continuing to fulfill our legislative mandate to make specimen date available for "public inspection, free of cost" and we plan to continue this effort long into the future!

Figure 13. Sample specimen of dotted blazing star in the Bell Museum Herbarium at the University of Minnesota. Image courtesy Tim Whitfeld.

Bell Museum Herbarium at the University of Minnesota
https://www.bellmuseum.umn.edu/plants/

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Assessing and Assigning Conservation Status Ranks to Minnesota's Vascular Plant Flora

by **Derek Anderson** ***(Botanist, MN Department of Natural Resources)***

Over the last year or so, perhaps you've heard a friend or colleague mention the term 'S-Ranks.' Perhaps you have overheard someone using the term in a passing conversation but have been left puzzled by this unfamiliar vocabulary. Well, look no further.

The idea of species conservation ranking comes from NatureServe, a conservation partner bringing together biodiversity data across state and country boundaries. Standard language and data management methods are critical to this task. One of the ways this is accomplished is through species conservation status ranking. This can be done at a variety of spatial scales, globally, nationally, or subnationally (*e.g.*, state or province). Depending on the level, a prefix is applied to the rank (G = Global, N = National, S = Subnational; in our case the state of Minnesota is the 'subnation'). This letter is then followed by a number or letter, signifying the risk of a particular species becoming extinct at the designated spatial scale. **Table 1** provides a definition for each of these levels.

How were S-Ranks Calculated?

The process of determining the conservation rank for a particular species considers several factors. These include the species' rarity, threats and trends. Information for all these factors is not often available for most species, but the calculator tool developed by NatureServe can still provide value with partial information and it can also incorporate uncertainty that might exist for any particular factor. The calculator gives more weight to species' rarity factors as these data are usually more readily available and verifiable.

Botanists with the Minnesota Biological Survey (MBS) utilized several data sources to help us assess the rarity factors for the vascular plants of Minnesota. These sources included our Natural Heritage Information System (NHIS) rare features database, the University of Minnesota Bell Atlas vascular plant collection database, our Releve database, and several national and state forestry resources. The professional expertise of other botanists was also considered during the review process. MBS staff helped to compile these resources, and then using Geographic Information Systems (GIS) spatial processing tools, calculated the rarity factor values.

Rarity Factors

The rarity factors only consider the more recent observations of a species that can reasonably be

Table 1. Definitions of Minnesota S-Ranks

Minnesota Rank (S-Rank)	Definition
S1	**Critically Imperiled** — At very high risk of extinction due to very restricted range, very few populations or occurrences, very steep declines, very severe threats, or other factors.
S2	**Imperiled** — At high risk of extinction due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.
S3	**Vulnerable** — At moderate risk of extinction due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.
S4	**Apparently Secure** — At fairly low risk of extinction due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.
S5	**Secure** — At very low risk or extinction due to a very extensive range, abundant populations or occurrences, and little to no concern from declines or threats.
SH	**Historical or Possibly Extinct/Extirpated** - Known from only historical occurrences but still some hope of rediscovery.
SX	**Presumed Extinct/Extirpated** — Not located despite intensive searches and virtually no likelihood of rediscovery.
SNA	**Not Applicable** — A conservation status rank is not applicable because the species is not a suitable target for conservation activities. (e.g., non-native species)
SNR	**Not Ranked** – Rank has not been assessed.
SU	**Unrankable** — Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.

Minnesota Plant Press

Volume 40. No. 2. July 2025

The *Minnesota Plant Press* is the newsletter of the Minnesota Native Plant Society. The newsletter is published quarterly, in January, April, July, and October. The deadline for contributions, which are welcome, is the first day of the publication month. Scientific names follow MNTaxa. Send articles, photos, suggestions, etc. to the co-editors, Brian Johnson & Steve Saupe at editors@mnnps.org. The Society officers are listed below:

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presumed still present in the state. Since this is the first time we have assessed all the vascular plant species in the state, we looked at records going back to 1980. The rarity factors we examined were range extent, area of occupancy and number of occurrences (or populations).

- **Range Extent** – This is the minimum area that can be drawn around all the present occurrences of a species found within the state.
- **Area of Occupancy** – The range extent is divided into a grid of 2 km x 2km cells. This factor then counts all the cells within the range extent where the species has been documented.
- **Number of Occurrences** – This is a count of the number of extant locations (populations) documented in the state.

Threats

Threats are more difficult to calculate. Major threat categories developed by the International Union for Conservation of Nature (IUCN) were used to determine an overall threat level for an individual species. These twelve broad ranging categories include everything from development, resource use, natural system modifications, invasive species, pollution and climate change. For many species, we lacked sufficient information to fully assess the threats, and in these instances, threats were not included in the S-Rank assessment.

Trends

Trends look at the status of a species over time. This could be looking at how the number of individuals in a population change over time, or how the number of populations in the state is changing over time. Like threats, trends are also difficult to assess, as this information was lacking for many of our vascular plant species. Like threats, trends were not utilized in the S-Rank analysis if data were not available.

How will S-Ranks be used?

S-Rank can help inform species conservation on a global scale as well as within the State of Minnesota. Since we followed the same process for assigning S-Ranks that other state programs of the NatureServe network used (**Figure 1**), it allows for a more comparable conservation assessment of a species on a larger scale (such as federally listing a species). Additionally, the S-Ranks can be an important component to inform other aspects of conservation.

One example is Species of Greatest Conservation Need (SGCN). This is a designation required by the U.S. Fish and Wildlife Service for the use in State Wildlife Action Plans. These documents serve as a basis for prioritizing conservation efforts. Another example of the utility of S-Ranks can be seen in the state listing

Table 2. Minnesota S-ranks

Rank	Taxa	Notes
S1	139	Critically imperiled taxa.
S2	185	Imperiled taxa.
S3	433	Vulnerable taxa.
S4	605	Apparently secure taxa.
S5	291	Secure taxa.
SNA	533	Non-native/introduced or hybrid taxa with no conservation value.
SU	243	Taxa with insufficient information to assign a rank at this time.

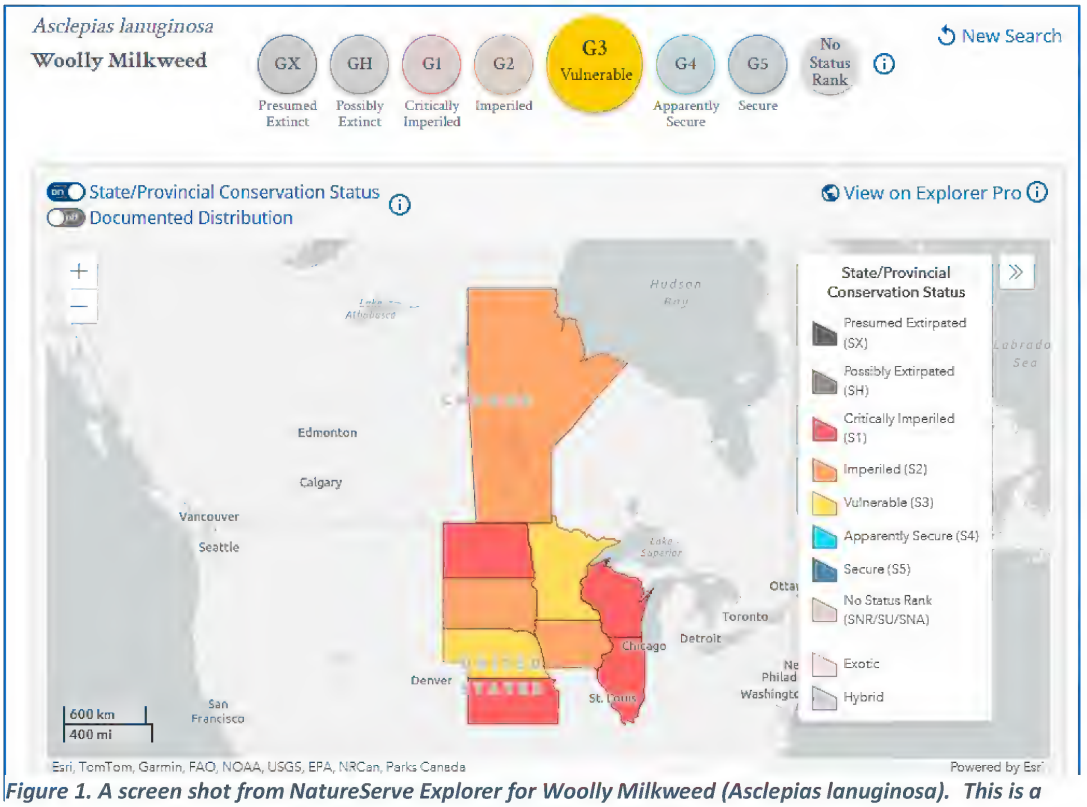


Figure 1. A screen shot from NatureServe Explorer for Woolly Milkweed (Asclepias lanuginosa). This is a species that is critically imperiled to vulnerable (S1 to S3) in all the jurisdictions where it has been documented. The combined information helps to determine that the species is Vulnerable (or G3) on a global scale.

process. By compiling data from multiple resources, the DNR has taken the first step in assessing risk of extirpation of a given species from the state. The next steps will be more closely reviewing rarity, threats and trends of the more at-risk species to determine the appropriate status, and finally making a recommendation for state listing status, if warranted.

Minnesota's Vascular Plant S-Ranks

We examined 2,474 vascular plant taxa. This number includes species, subtaxa (species that have more than one subspecies or variety in Minnesota), and a few hybrids. Table 1 and **Figure 2** show a breakdown of each conservation status for the taxa we reviewed.

One of the many things we learned during this process is that there are several 'weedy' but native taxa that are not often documented in our traditional surveying efforts. Giant ragweed (*Ambrosia trifida*) is a prime example. This species is found along roadsides, and disturbed places throughout much of the state. However, these habitats are overlooked or not often documented in traditional survey work. This review process also brought to our attention many species that may be rarer than we thought. As a result, some of these species may be added to our Watchlist to help encourage data collection and future refinement of their conservation status ranks (S-Ranks).

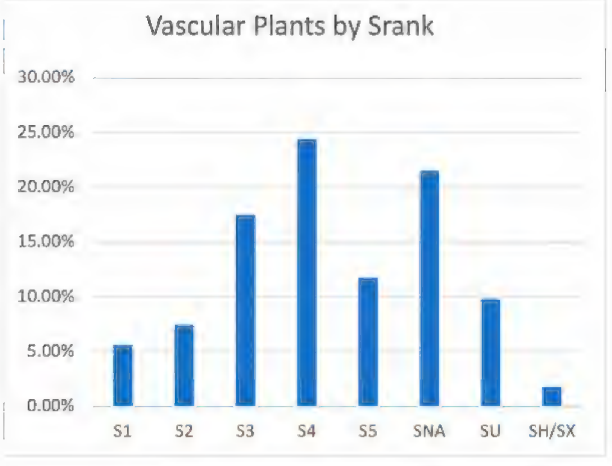


Figure 2. A bar graph showing the percentage of vascular plant taxa falling into each conservation status rank

Looking forward, we are planning to make the S-Ranks available as an attribute of our MNTaxa database. The S-Ranks will also eventually be incorporated into the NatureServe database. And, after that point, they will be available on the NatureServe Explorer website.

In the future, we will be able to build off the work of this initial assessment and hopefully improve steps in the process. We will also work toward filling in knowledge gaps for species including their distribution, abundance and more thorough threat assessments.

Additional Resources

- Minnesota Biological Survey
- Minnesota's Rare Species Guide
- NatureServe
- NatureServe Explorer

Notes from the Herbarium

by **Tim Whitfeld** *(Collections Manager of the Bell Museum Herbarium at the University of Minnesota)*

From time to time, we receive communication from individuals looking to donate a batch of old specimens they've turned up while clearing out their basements or reorganizing their attics. In most cases, the specimens were collected by a distant ancestor, probably for a college or high school project, in an era well before widespread indoor plumbing.

Sadly, more often than not we're unable to accept the specimens because they lack dates and locations (a requirement for all scientific collections) or they're crumbling into dust after decades in storage. Occasionally, however, some treasures do appear. This was the case recently when I was contacted by a person from Edmond, Oklahoma asking if we might be interested in receiving a volume of bound and pressed plant specimens, collected in Minnesota in the late 1800s.

Our friend from Oklahoma had purchased the volume from a farm auction thirty-five years prior but knew nothing of their provenance. Since the specimens were originally from Minnesota, he felt they should be repatriated to their home state so he sent some pictures for me to assess their condition. Based on these images I could see the specimens were mostly in good condition with at least bare-bones collection information and it wasn't long before a package from Oklahoma arrived containing 71 pressed plant specimens in a slightly battered, but still intact, binding.

Figure 3. Pasqueflower from the "Villa Maria" collection. Image courtesy Tim Whitfeld.

The specimens were all collected in 1887, between April and September. There's no mention of who made the collections, but they came from southeast Minnesota, in the area around Lake City and Frontenac. Many of the specimens also mention "Villa Maria" as the collection location. With a little digging, I found an article written by Ettie Madeline Vogel in the Records of the American Catholic Historical Society of Philadelphia (1886), which mentions a convent (Villa Maria Academy) established by "a community of eleven professed Ursuline Sisters of the Roman Union, Central Province," in Lake City, Minnesota. The Sisters established the school for girls in 1891 on a high bluff overlooking the Mississippi River. By the mid-1940s,

more space was needed for the school so a new building was constructed (Marian Hall) in the style of a French chateau. Sadly, the original school buildings were destroyed in a fire in March 1969 and, although Marian Hall was not damaged, the school ended up closing later that year. The Sisters then transitioned to using their site as a retreat center, which closed in 2016, and the property was subsequently sold to a developer who turned Marian Hall into an event center.

This all happened after our collector (maybe one of the eleven professed?) made their herbarium specimens in 1887. She(?) focused much of her attention on common spring wildflowers so, among other species, there are collections of pasqueflower (April 12, 1887; **Figure 3**), hepatica (April 25), bloodroot (April 30), and Jacob's ladder (May 4). The collector must have ventured into wet areas because there's a specimen of marsh marigold (May 5; **Figure 4**) and she must have explored some of the area's goat prairies where she encountered hoary puccoon on May 13, prairie smoke on May 4 (**Figure 5**), and scarlet paintbrush on May 13. There's also a specimen of yellow lady's slipper from May 18 and, later in the summer, wild mint (July 26) and jewelweed (August 8). Overall, she collected a good cross-section of plants from a variety of habitats.

As with all herbarium specimens, the collections provide a snapshot of plant diversity from this time and place. They also provide other information that the original collector couldn't have anticipated. For example, the specimens document flowering dates in the late 1800s for each of the included species. This information can be used as a comparison for flowering dates in the 21st century, to document the effect of climate change on plant phenology.

We'll probably never know who made the collections but one thing we do know is whoever it was had excellent handwriting and a keen interest in the flora of southeastern Minnesota! They can rest easy knowing that, after a peripatetic first 138 years, the specimens will be secure in the Bell Museum Herbarium for many decades to come

Figure 4. Marsh marigold (Caltha palustris) from the "Villa Maria" collection. Image courtesy Tim Whitfeld.

Figure 5. Prairie smoke (Geum triflorum) from the "Villa Maria" collection. Image courtesy Tim Whitfeld.

A Unique Plant Community: White Pine–Red Maple Swamps of Glacial Lake Wisconsin

by **Steve Eggers** ***(Senior Ecologist, US Army Corps of Engineers)***

White Pine (*Pinus strobus*)–Red Maple (*Acer rubrum*) Swamps (**Figure 6**) are a rare community occurring on wet-mesic sites along headwater streams and within groundwater seepages in and around the bed of extinct Glacial Lake Wisconsin (**Figure 7**). A high groundwater table and sandy soils with a thin layer of living Sphagnum mosses, but minimal peat accumulation, are typical. Inundation does not occur. Microtopography is present and primarily occurs from wind-thrown canopy trees. Overall, these communities meet the three technical criteria for wetlands—hydric soils, wetland hydrology and dominance by hydrophytes (wetland plants) – in accordance with the methodology applied by federal and state agencies: the Corps of Engineers Wetlands Delineation Manual (1987 *Manual*) and applicable regional supplement. White pine is not typically thought of as a wetland tree species so its occurrence as a dominant in this wetland community is interesting. The National Wetland Plant List, which assigns one of five ratings to each plant species as to its frequency of occurrence in wetlands (**Table 3**), applies a rating of "facultative-upland" (FACU) to white pine which means that it usually occurs in uplands but occasionally occurs in wetlands. Thus, the occurrence of a facultative-upland species in wetlands is not unusual, but occurrence as a dominant is. Tree size white pines in this community frequently exhibit what is referred to as a "morphological adaptation" to survival in wetlands – forming shallow root systems and raised hummocks to keep as much of its root system as possible above the zone where soils are saturated /anaerobic. In comparison, red maple is assigned a rating of "facultative" (FAC) which means it occurs with more or less equal frequency in both wetlands and uplands.

White Pine–Red Maple Swamps are often transitional between xeric upland forest communities of oak (*Quercus* spp.), pine (*Pinus* spp.) and quaking aspen (*Populus tremuloides* – FAC) and saturated, acidic peatland forests of black spruce (*Picea mariana* – FACW) and tamarack (*Larix laricina* – FACW) as well as open bogs and sedge meadows. These communities were impacted by intensive logging of white pine dating to the late 1800s. Today the oldest stands are 140- to 150-year-old second growth.

Canopy associates with white pine and red maple include yellow birch (*Betula alleghaniensis* – FAC), tamarack, black ash (*Fraxinus nigra* – FACW), northern red oak (Quercus rubra – FACU) and infrequently jack pine (*Pinus banksiana* – FACU) or red pine (*Pinus resinosa* – FACU). Saplings and seedlings of white pine are typically abundant in spite of high populations of white-tailed deer. Dominant tall shrubs include winterberry holly (*Ilex verticillata* – FACW), speckled alder (*Alnus incana* ssp. *rugosa* – FACW) and poison sumac (*Toxicodendron vernix* – OBL). Low shrubs include dwarf red raspberry (*Rubus pubescens* – FACW) and both low bush

Figure 6. Habitat view of a White pine – Red maple Swamp. Image courtesy Steve Eggers.

TABLE 3	
Indicator Rating	**Occurrence in Wetlands**
Obligate (OBL)	Almost always occur, under natural conditions, in wetlands
Facultative Wetland (FACW)	Usually occur in wetlands but occasionally occur in uplands
Facultative (FAC)	Equally likely to occur in wetlands and uplands
Facultative Upland (FACU)	Usually occur in uplands but occasionally occur in wetlands
Upland (UPL)	Almost always occur, under natural conditions, in uplands

blueberry (*Vaccinium angustifolium* – FACU) and velvet-leaf blueberry (*V. myrtilloides* – FACW). Cinnamon fern (*Osmunda cinnamomea* – FACW) is typically the dominant herb and can form an almost unbroken layer one meter or more in height. Other common herbaceous species are skunk cabbage (*Symplocarpus foetidus* – OBL), royal fern (*Osmunda regalis* var. *spectabilis* – OBL), gold-thread (*Coptis trifolia* – FACW) and sedges (*Carex* spp.). Two characteristic species of this community are disjuncts from the eastern United States: long sedge (*Carex folliculata* – OBL) and bog fern (*Parathelypteris simulate* – FACW). In Wisconsin, *C. folliculata* is only found in or near the borders of Glacial Lake Wisconsin (**Figure 8**).

Wildlife species include rare, uncommon or otherwise noteworthy species such as Northern goshawk, Red-shouldered hawk, four-toed salamander and three shrew species—water shrew, American pygmy shrew and Arctic shrew. Many northern bird species, some of which are at their southern range limits, nest in this community including Broad-winged Hawk, Northern Saw-whet Owl, Veery, Hermit Thrush, Red-breasted Nuthatch, Blue-headed Vireo, and Canada, Pine, Blackburnian and Black-throated Green Warblers. Game birds include Wild Turkey, Ruffed Grouse and American Woodcock.

A Regulatory Case Study: A proposed project that would have impacted a White Pine–Red Maple Swamp in Monroe County, Wisconsin was the subject of litigation that went all the way to the Wisconsin Supreme Court. In 2016, Meteor Timber proposed to fill 16.25 acres of this community to build a frac sand mining processing and rail loading facility. Initially the necessary wetland fill permits were issued with numerous conditions that included compensatory mitigation to offset adverse impacts. This was in spite of findings by the Wisconsin Department of Natural Resources (WDNR) that the proposed project would result in permanent and irreversible impacts to an exceptional quality, imperiled habitat. Clean Wisconsin and the Ho-Chunk Nation opposed the project and litigation ensued. In 2018, an Administrative Law Judge revoked the permit issued by the WDNR. Next, in 2021, a state appeals court upheld the lower court rulings that the WDNR violated the law when it issued the permit. Specifically, the WDNR lacked sufficient information to assess environmental impacts and improperly amended a permit that was granted in spite of numerous unanswered questions including whether mitigation could successfully offset the loss of this rare wetland resource. The case then went to the Wisconsin Supreme Court which, in 2022, declined to hear the case thereby denying the company's petition to reconsider the findings of lower courts.

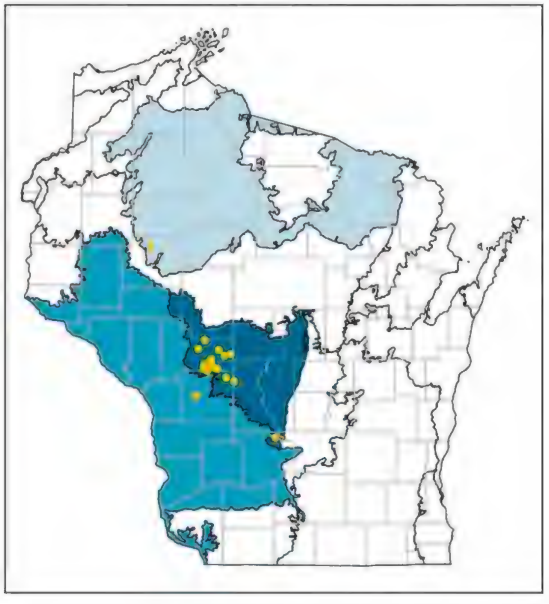


Figure 7. (left) Map from Wisconsin Department of Natural Resources. In the public domain.

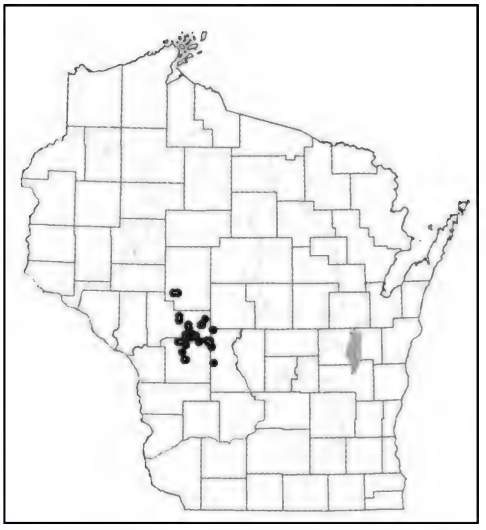


Figure 8. Distribution of Long Sedge (Carex folliculata) in Wisconsin (from Field Guide to Wisconsin Sedges by Hipp (2008)). Used with permission.

Minnesota Wildflowers Plant of the Month: *Potentilla hippiana*

by *Katy Chayka, MN Wildflowers (www.mnwildflowers.info)*

Family: Rosaceae (rose)
Common names: Wooly cinquefoil
Life cycle Perennial
Plant height: 4 to 20 inches
Bloom season: June-July
Habitat: Dry sandy or rocky soil; prairies, plains, meadows, forest, tundra

Figure 9. Potentilla hippiana. Photo by Katy Chayka taken in Polk County.

Plant description

Flowers: Branching cluster at the top of the stem. Flowers are yellow, about ½ inch diameter, with 5 broad petals that are tapered at the base and rounded, straight across, or slightly depressed at the tip. In the center are about 20 yellow stamens. The calyx cupping the flowers has 5 triangular to lance-shaped, sharply pointed sepals that are somewhat shorter than the petals. Behind each petal, alternating with the sepals, is a narrowly lance-elliptic bractlet shorter than the sepals. The calyx and flower stalks are covered in woolly hairs.

Leaves and stem: Leaves are mostly basal, pinnately compound with 7 to 13 leaflets, on stalks 1 to 4+ inches (1 to 10+ cm) long. Leaflets are oblong-elliptic in outline, ¾ to 2 inches (to 5 cm) long, the edges with a few to several large teeth or shallow lobes cut usually less than halfway to the midvein. The lowest leaflets are smallest, becoming larger as they ascend the stalk. The 1 to 3 stem leaves are much smaller, the uppermost stalkless or nearly so. The upper surface is gray-green with long, appressed, silky hairs; the lower surface silvery from dense woolly hairs. Stems are multiple from the base, erect to ascending to spreading, unbranched except in the flower clusters, covered in woolly hairs, and 2 to 4 times as long as the basal leaves.

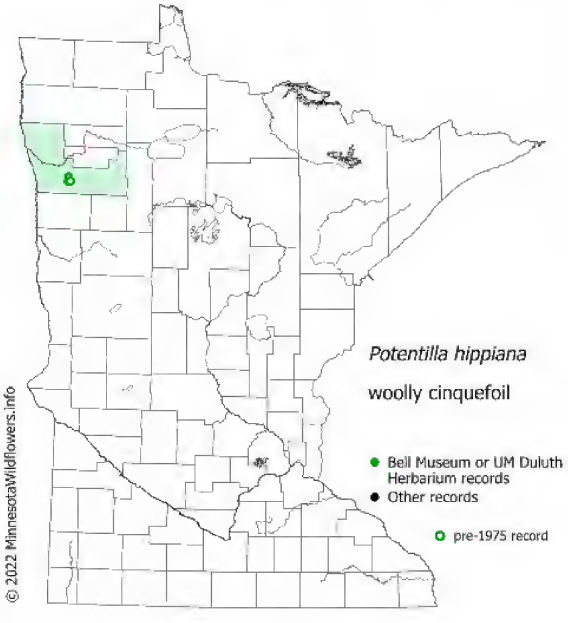


Figure 10. Minnesota county distribution map ©Minnesota Wildflowers Information.

Fruit: The sepals fold up, creating a capsule-like container, and eventually turn dark brown. Inside are many brown seeds, about 1.5 mm long. The old fruiting stems can persist through winter.

Notes

Potentilla hippiana is primarily a species of alpine meadows, mixed conifer forests, aspen stands and grassy slopes, common in the Rocky Mountains with scattered populations in the Great Plains. Minnesota sits on the eastern edge of its range and populations east of here are likely introduced. The flowers resemble those of other yellow-flowered *Potentilla* species, but the leaves are pretty distinctive and should not be confused with the others.

According to the DNR, the handful of state records are all from a small area in Polk County in dry, gravelly prairies. The first record dates back to 1900.

Figure 11. Photo by Katy Chayka taken in Polk County.

It was collected from the same location in 1937, then went undetected for nearly 80 years before it was found again in the mid-2010s on the gravel beach ridges of Glacial Lake Agassiz in the vicinity of past collections. Despite survey efforts in similar gravel beach ridges in the area, only two populations have been found, about 3 miles apart. In addition to the rarity of this species, its gravel prairie habitat is highly threatened by mining interests so it was added to the MN DNR Plant Watchlist in 2019 and will likely be considered for Endangered status during the next revision of the state's rare species list.

More images of wooly cinquefoil are available at:

https://www.minnesotawildflowers.info/flower/woolly-cinquefoil

Minnesota Wildflowers Website:
https://www.minnesotawildflowers.info

MINNESOTA NATIVE PLANT SOCIETY

Sphagnum Identification and Ecology Field Course

August 25 – 29, 2025

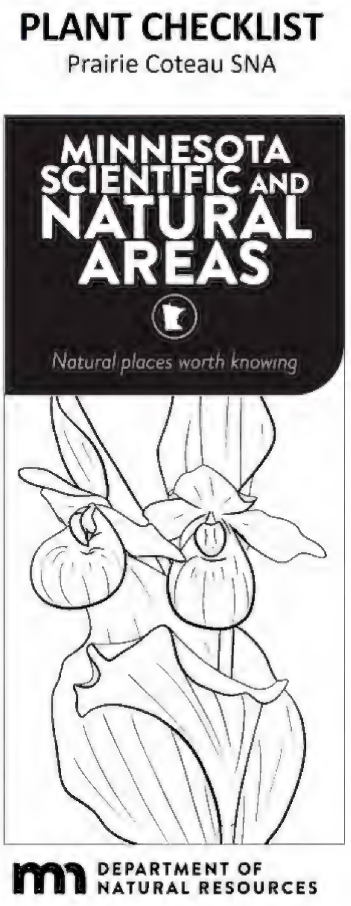
Registration: email mfeist@wisc.edu
Instructor: Jon Shaw (assisted by Mary Ann Feist & Keir Wefferling)
Location: Kemp Natural Resources Station, Oneida County, Wisconsin

The focus of this workshop hosted by the Botanical Club of Wisconsin is the identification of *Sphagnum* (peatmoss) species of northern Wisconsin in the field and under the microscope. Each day will include a presentation on aspects of Sphagnum biology, a field trip to see and collect species in nearby peatlands, and guided microscope work to observe anatomical characters critical to the identification of species. This Field Course will be held at Kemp Natural Resources Station, Oneida County, Wisconsin. Cost for the course is $550 for BCW Members and $600 for Non-Members. Registration cost includes instruction, meals, and shared lodging from 4:00 p.m. Monday August 25th to 1:00 p.m. Friday August 29th. A reduced rate ($275) for students is available (for up to four students). The course is limited to 15 participants.

SNA Plant Lists Have Been Updated

by Brian Johnson *(MNNPS co-editor)* and Kelly Randall *(Statewide Outreach Consultant, Scientific and Natural Areas Unit, MN DNR)*

Users of the DNR SNA website have probably noticed that the plant lists for Scientific and Natural Areas have a different look to them. Such lists were started in about 2005 shortly after the web pages for each site were produced in 2002. Originally based on data from the Minnesota Biological Survey, the lists were produced by SNA staff and others. Since at least some of the lists approached their twentieth year, a team was created to update them.



Species	Confidence
AQUATICS	
__ slender naiad (*Najas gracillima*)[SPC]	3
__ water smartweed (*Persicaria amphibia*)	1
CLIMBERS/VINES AND EPIPHYTES	
__ dwarf mistletoe (*Arceuthobium pusillum*)	3
__ wild honeysuckle (*Lonicera dioica*)	3
FERNS AND LYCOPHYTES	
__ prairie moonwort (*Botrychium campestre*)	1
__ northern ground-cedar (*Diphasiastrum complanatum*)	3
__ Goldie's woodfern (*Dryopteris goldieana*)[SPC]	3
__ field horsetail (*Equisetum arvense*)	3
__ smooth scouring rush (*Equisetum laevigatum*)	1
__ common scouring rush (*Equisetum praealtum*)	3
__ meadow horsetail (*Equisetum pratense*)	2
__ blackfoot quillwort (*Isoetes melanopoda*)[END]	3
FORBS	
__ common yarrow (*Achillea millefolium*)	2
__ rough false foxglove (*Agalinis aspera*)	3
__ roadside agrimony (*Agrimonia striata*)	2
__ prairie wild onion (*Allium stellatum*)	2
__ white wild onion (*Allium textile*)	2
__ common ragweed (*Ambrosia artemisiifolia*)	2
__ western ragweed (*Ambrosia psilostachya*)	2
__ small round-leaved orchis (*Amerorchis rotundifolia*)	3
__ hog peanut (*Amphicarpaea bracteata*)	3
__ canada anemone (*Anemone canadensis*)	1
__ long-headed thimbleweed (*Anemone cylindrica*)	2
__ pasqueflower (*Anemone patens*)	2
__ tall thimbleweed (*Anemone virginiana*)	1
__ field pussytoes (*Antennaria neglecta*)	2
__ plantain-leaved pussytoes (*Antennaria plantaginifolia*)	3
__ spreading dogbane (*Apocynum androsaemifolium*)	2
__ American hemp (*Apocynum cannabinum*)	2
__ clasping dogbane (*Apocynum sibiricum*)	3
__ hairy rock cress (*Arabis pycnocarpa*)	1

Figure 12. A portion of the new plant list for Prairie Coteau SNA.

The project team was composed of SNA staff members Kelly Randall, AmberBeth VanNingen, and Arika McGraw, and MBS members Michael Lee, Derek Anderson, Rhett Johnson and Bob Dunlap. Kelly Randall organized and facilitated the team's activities. The goals for the project were to make the plant lists accurate, easy to use, view and print, and employ current taxonomy. Further, the lists were to be data- and expert-driven with documentation of data sources. Finally, the lists were designed to be easier to update. To these ends, resource experts on invasive species, MNTaxa: The State of Minnesota Vascular Plant Checklist, and web implementation were also included as needed. The project began in March of 2023 and the updated lists were published in December of 2024. Going forward, the expectation is that these checklists will be updated on a regular basis.

A portion of a plant list in the new format is shown in **Figure 12**. Plants are sorted into different categories, including graminoids, forbs and ferns/lycophytes. Rare and introduced species are marked as such. The source of the data (vouchered specimen in an herbarium, an observation by DNR staff, or other) is indicated. The lists are laid out in such a way that a user can print the list and create a threefold pamphlet for use as a field checklist, if desired.

To update a particular plant list, the former plant checklist was used as the starting point. Additional data sources included iNaturalist, the Biodiversity Atlas, DNR contractors and Bioblitzes. The sources were compared, and missing species were added. This was an automated process developed by the co-managers of this project. Data are currently being quality-checked this year (feel free to help with that, Plant Society members!) and will likely result in additions as well as some species that will be removed in future checklists. Experts have already found locational information for some species that was incorrect. For example, some generalized location data show species on at least one SNA that experts know does not actually occur there. Those data points need to be refined. This process was based on the update to the SNA bird checklists, which was completed about a year earlier.

Early feedback on the new plant lists has been positive. The project team is interested in MN Native Plant Society members' feedback. If you wish to supply comments on the project or suggest additions or deletions to the plants lists, please email sna@dnr@state.mn.us to request access to a survey tool. A plant checklist can be found on each SNA's web page, or in one location at the URL: mndnr.gov/snas/plant-checklists.html.

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A Day with PlantWatch

by **Brian Johnson** ***(MNNPS co-editor)***

The vehicle convoy comes to a halt along the side of the highway. The PlantWatch team exits the vehicles and meets on a field approach to begin the morning's work. We are all looking forward to another new prairie to visit!

PlantWatch is a joint venture between the Minnesota DNR and the University of Minnesota Landscape Arboretum. Today we are in western Minnesota to search for *Astragalus flexuosus* var. *flexuosus* (slender milkvetch; **Figure 13**), a plant classified as Special Concern in Minnesota and associated with dry to mesic prairies.

Slender milkvetch is primarily a Great Plains species at the eastern edge of its range in Minnesota, where it is found primarily in three counties – Big Stone, Traverse, and Lac Qui Parle. These were among the first surveyed by the DNR Minnesota Biological Survey in the 1980's. Many of the sites have not been visited since, but some recent trips by the DNR to the area have indicated that this plant has become much less common.

Today's trip is part of a four-day excursion to examine many of the old sites, particularly those on private land. This work, supported by a LCCMR grant, will help the DNR evaluate and improve a Species Distribution Model that was created for slender milkvetch.

Using GIS and modelling software, the model will predict potential new locations for this species based on the characteristics of sites where the plant was recorded in the past. The DNR will use the new information to refine the model to increase its predictive accuracy. Since some sites are hundreds of acres but contain only 2-3 plants, the size of the PlantWatch team will help to increase the search efficiency and improve the model.

Figure 13. A. flexuosus var. flexuosus (pink flowers in center) with Astragalus lotiflorus in the upper right. Image courtesy Brian Johnson.

Our team includes Deanna Leigh of PlantWatch and Fred Harris of the DNR Minnesota Biological Survey. Fred quickly reviews the characteristics of the target plant with the group, and how it might be separated from some look-alikes, in this case young leadplant, vetches including *Lathyrus palustrus*, and other astragali, including *A. crassicarpus* (ground plum) *A. agrestis* (field milkvetch) and *A. adsurgens* (prairie milkvetch).

One volunteer logs into the Field Maps app we will use to count plants and does the initial login protocol for the group. There are ten of us today, so we split into two teams. One will explore the hill prairie to the south of a ravine, the other will go north, and we plan to meet somewhere in the middle. We are all reminded to turn on the Avenza app used to record our tracks, and away we go!

My group crosses a small field and begins to ascend the hill. We initially walk through an area covered in smooth brome (*Bromus inermis*) and wolfberry (*Symphoricarpus occidentalis*), a poor environment for our plant. As we continue ascending, we reach a level where there is a wider variety of native plants. We continue to work toward the ravine, and the diversity of the plants continues to improve. We note downy painted cup (*Castilleja sessiliflora*), stiffstem flax (*Linum rigidum*), toothed evening primrose (*Oenothera serrulata*) and green milkweed (*Asclepias viridiflora*), but no slender milkvetch.

We continue toward the ravine and encounter a steep gravelly slope. A particularly beautiful purple locoweed (*Oxytropis lambertii* var. *lambertii*) catches my eye, and I walk toward it to take a picture. Then the small purple-pink raceme of another plant catches my eye. I believe it is our target species and call Fred over for confirmation. He agrees, and more plants start appearing. We begin flagging them. We also note soft goldenrod (*Solidago mollis)* and western white prairie clover (*Dalea candida* var. *oligophylla)* nearby, two other state Special Concern species. A quality prairie, indeed!

We continue to notice more of our target plants. When it appears as though we've flagged them all, we count and record the gps coordinates of the plants on the Trail Maps app. We reach a total of about 60 plants. We move to the top of the bluff and observe a return to smooth brome and "buckbrush," the locals' name for wolfberry.

The other group appears in the distance. After meeting up, they also report a beautiful and diverse prairie but no additional target plants. We all return to the area of the bluff with an excellent view of the border lake (**Figure 14**) to enjoy our lunch. This is another opportunity to share the prairie flowers together and visit. The volunteers for the four-day event include natural resource professionals and amateur botanists, those in their twenties as well as those in their seventies, approximately equal numbers of men and women, and those from the Iron Range, the metro and St. Cloud areas, and some with ties to western Minnesota.

The weather was perfect for today's visit--the temperature was in the high sixties, a far cry from the previous day when it exceeded ninety degrees. And little did we know that the next day our final surveys would be completed in a drenching rain.

Since we have another set of sites to complete that day, we reluctantly leave the bluff and return to our vehicles. We all work together to complete the site checkout on the Field Maps app. This includes estimating the percentage of target plants that were flowering, the native grasses, forbs and woody species that were associated with it, a listing of any invasive species present, the type of management practices observed and other characteristics of the site. After all surveys are complete, DNR staff will use this information to describe the current population and update the Species Distribution Model. Initially it appears as though *Astragalus flexuosus* does well in pastures and appears to be disappearing from formerly grazed sites that have not seen any grazing in 30-40 years. In the meantime, we turn off our Avenza tracks, hop in our vehicles, and proceed to the next prairie!

Figure 14. PlantWatch team members compare notes in the Astragalus search area. Image courtesy Deanna Leigh.

Friend or Foe?

by Stephen Saupe *(MNNPS co-editor)*

"Who goes there: Friend or foe?"

This question is always on my mind when botanizing. Like the sentry at a gate who must distinguish a welcome visitor from an enemy, I am always assessing whether a particular plant is my friend or foe.

That's because I'm rather allergic to the resin, urushiol, found in poison ivy and its relatives. I am constantly on guard to distinguish these botanical enemies from my photosynthetic allies.

My main foe is western poison ivy (*Toxicodendron rydbergii*; **Figure 16**). Unfortunately, it extremely common throughout Minnesota. It grows in an amazing diversity of habitats (*i.e.*, mature hardwoods, prairies, disturbed areas) where a derm-atology-challenged botanist might walk.

Despite its name, common poison ivy (*T. radicans* subsp. *negundo;* (**Figure 15**) is not nearly as abundant in Minnesota. It grows mainly in flood plain forests in the SE corner of the state and often grows as a vine that climbs by aerial roots that can give the stem a somewhat hairy appearance. I recently returned from a visit to see our relatives who live near Philadelphia and was awed, and horrified, by the size of some of the vines.

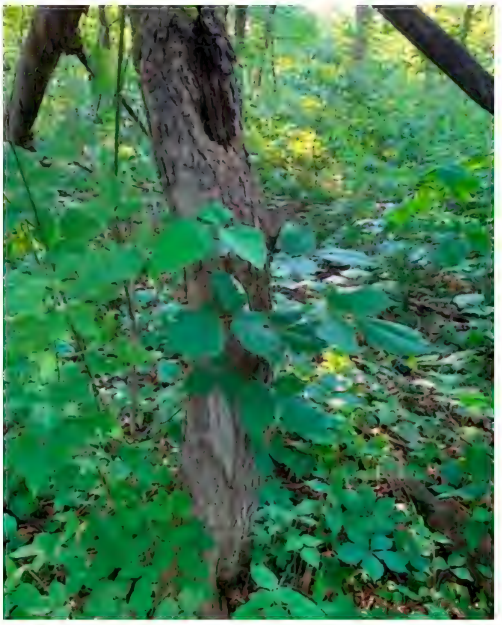


Figure 15. Common poison ivy climbing a tree in SE MN. Image courtesy Steve Saupe.

Poison sumac (*T. vernix*) also occurs in Minnesota, but is uncommon. Unless you hang out in swamps around the Twin Cities, you are unlikely to encounter these short-stature trees with compound leaves. Similarly, you needn't worry about poison oak (*T. diversilobum*). This foe doesn't grow east of the Rocky Mountains.

Perhaps the easiest way to recognize poison ivy is to remember the rhyme, "Leaflets three, let it be." Both western and common poison ivy have trifoliate leaves with the stalk of the middle leaflet being longer than the other two.

Figure 16. A formidable wall of Western poison ivy waiting for an unsuspecting botanist. Image courtesy Steve Saupe.

A number of botanical "friends" can be mistaken for poison ivy. These poison ivy lookalikes usually have trifoliate leaves. Welby Smith, in his outstanding book *Trees and Shrubs of Minnesota,* lists several including woodbine (*Parthenocissus inserta*), Jack-in-the-pulpit (*Arisaema triphyllum*), and trilliums (*Trillium* sp.).

Whenever my daughters and I go for a walk, I like to test their poison ivy identification skills by playing an informal game of "friend or foe?" I quiz them on their ability to recognize poison ivy, and especially like to try and trick them with some of the look-alikes.

In addition to the mimics that Welby mentions, there are many others. Hog peanut (*Amphicarpaea bracteata*; **Figure 17**) can be especially tricky because it frequently grows side-by-side with poison ivy. It's easy to recognize if you see its small, purplish papilionoid flowers. But since it is often not in flower, a more

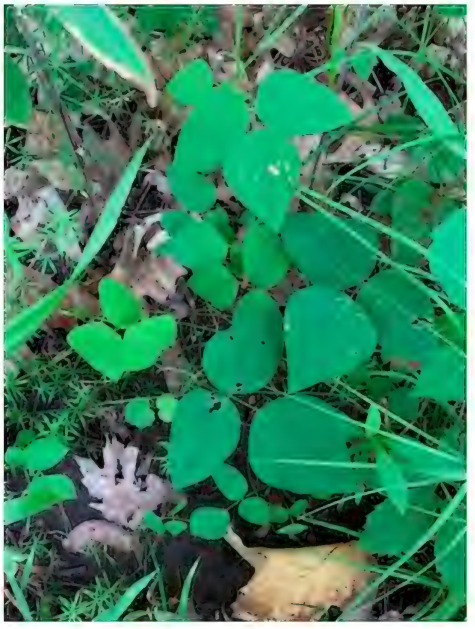


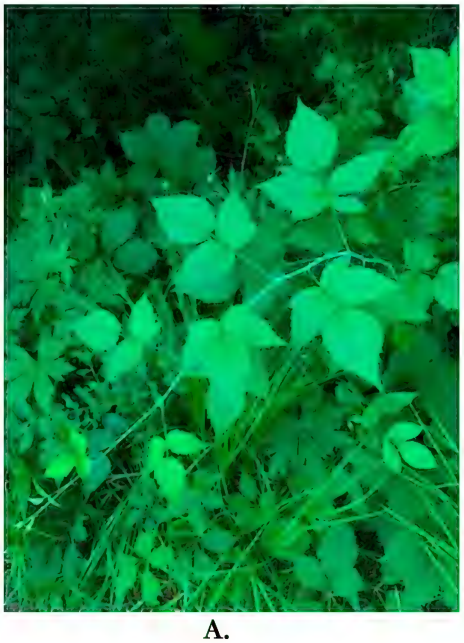
Figure 17. Hog peanut. Image courtesy Steve Saupe.

reliable identification feature for hog peanut is that its leaflets have entire (smooth) margins, unlike the toothed margins of poison ivy.

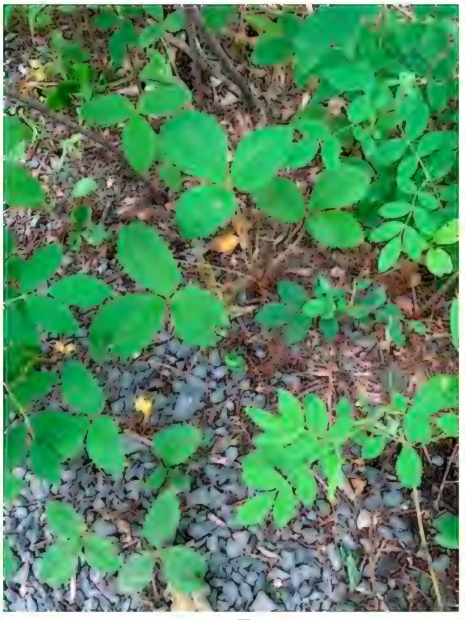
Other friendly plants that, at times, can look a little, like poison ivy include wild strawberries (*Fragaria* sp.), several species of brambles (*Rubus* sp.), young box elder (*Acer negundo*) and green ash trees (*Fraxinus pensylvanica*), tick-trefoil (*Desmodium* sp.), honewort (*Cryptotaenia canadensis*), liverleaf (*Hepatica* sp.), black snakeroot (*Sanicula* sp.), wood anemone (*Anemone quinquefolia*), wild sarsaparilla (*Aralia nudicaulis*), and bladdernut (*Staphylea trifolia).* There are a few other species also might be mistaken for poison ivy by the casual botanist, but are not likely to be encountered on a typical forest walk such as dwarf ginseng (*Panax trifolius*) and goldthread (*Coptis trifolia*).

Below is a poison ivy look-alike mini-quiz that my daughter Amy and I have created. Can you distinguish these friends from the foes?

(**Note**: Answers at end of newsletter. ***All images by Amy Saupe. Used with permission).***



A.



B.

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D.

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F.

Destination Botany: Lost Lake Peatland SNA

by **Brian Johnson** ***(MNNPS co-editor)***

This issue's Destination Botany features Lost Lake Peatland SNA, near Tower, Minnesota. And I was almost there! Continue reading for details.

Like many of the peatland SNAs, Lost Lake Peatland is challenging to access. In this particular case one can literally drive to and park on SNA land. However, getting into the peatland requires passing though the "moat" of willow and alder around much of the perimeter, where navigation and progress are challenging. An alternative to at least some of the difficult hiking may be to take a canoe or other watercraft from the boat landing on Lost Lake to the peatland. However, if it is done the reward is high—a ribbed fen, a featureless water track, and a raised bog occur here. As a result, this site is host to a number of rare plants including montane yellow-eyed grass (*Xyris montana*) and small green wood orchid (*Platanthera clavellata*). The plant list for the SNA features an additional six orchids.

My visit was part of an "orchid hike" on June 29th sponsored by the DNR SNA staff and advertised on the SNA events calendar. Approximately twenty of us met on a gravel road near the entrance to the SNA. Arika McGraw, a northeast region DNR naturalist, led the hike. She introduced herself and gave a brief background on this SNA. Given the inaccessibility of the SNA and the fact that it was advertised as a one-hour hike, she announced that we would probably not be entering the SNA proper but would be hiking on a snowmobile trail just outside it (see **Figure 18**) to get a feel for the experience.

Arika led the group from the road shoulder into the ditch. She took a couple of tentative steps though a very wet area and came up on a sphagnum mat which formed the basis for the snowmobile trail. Though we had been advised to wear high rubber boots, in some cases the first few steps were a doozy—water up and over the top and into the boots! Then we too were on the mat and ready to begin exploring. Arika turned us loose to explore on our own or to stay near her and get help with plant identification.

Figure 18. A view down the Arrowhead State Trail, primarily a snowmobile trail, where the hike occurred. Ultimately, it enters the SNA. Image courtesy Brian Johnson.

Arika pointed out a wild calla (*Calla palustris*) which was just completing its flowering. Someone spied a larger plant with a reddish-brown flower, which turned out to be marsh cinquefoil (*Potentilla palustris*). We quickly noticed that the longer one stood in one place, the deeper one sunk in the mat. For some, this was the impetus to move ahead faster. Others needed no such impetus to move ahead, as the hope of seeing something new drew them on. After about a hundred feet several of us noted some beautiful pink flowers. Closer investigation revealed them to be rose pogonia (*Pogonia ophioglossoides*). Soon we were all seeing them, ahead and off to the side. By the end of our hour, we probably saw a thousand.

We continued to move forward. Another type of pink flower became visible. Taller and with larger flowers, these were the tuberous grass pink (*Calopogon tuberosus* var. *tuberosus*). Once our eyes were properly trained, they stood out like beacons visible from more than fifty feet away. Then a real treasure – a hiker noticed a white one (**Fig. 19**).

Each few steps seemed to promise another new plant. Could we find

the small green wood orchid? Would we see any of the three species of sundew (*Drosera* sp.) reported to be in this SNA? Or would we run out of time before we could make any further discoveries? Unfortunately, Father Time won, as we were called back since four o'clock approached. As I neared the ditch and my reluctant departure from the sphagnum mat, it was my turn to have a careless step. One boot was submerged, but it felt good on a hot day.

The trip to Lost Lake Peatland delivered on its promise of adventure. The three o'clock start allowed those of us travelling from longer distances to depart from and return home at a reasonable time. It was fun to meet others interested in native plants and wild places. And, while it is rewarding and beneficial to remove invasives or gather seeds as is the goal of some other events on the DNR SNA calendar, it was enjoyable just to visit an SNA and see what it has to offer. Thanks to Arika and the DNR for making this possible.

Figure 19. A white tuberous grass pink. Image courtesy Brian Johnson.

Summary of the May Meeting Presentation: *Lessons Learned in Protecting and Restoring Biodiversity*

by **Bonnie Harper-Lore & Gary Lore**

(**Editor's Note**: The May program featured a presentation about their new book with contributions from 85 scientists, educators, practitioners, policymakers and citizen scientists. It was published Cambridge Scholars Press. It is intended for use as a textbook. The figures were printed in black and white to reduce cost. The book was released in paperback on June 10th and can be ordered from Cambridge Scholars Publishing for about $50. The following is a summary of chapters in the book.)

Each of the 10 Parts of this essay collection begins with an action word for a reason. Essays reveal why and how citizens, educators, scientists, practitioners, and policymakers solved many "crisis" issues at the local, state and national levels. Their words underscore that conservation work is not done alone but rather via networks and partnerships across jurisdictional lines in unique agreements, with new tools, and rulemaking. What continues to limit action appears to be public understanding and support. It is the reader's responsibility to build on what we learned and move the public

to become stewards of the land. No one does conservation work alone.

1. **Protecting Nature**: Since the 1970's, our natural heritage has been protected by law, preserves, inventory mapping and research. That accumulated natural history knowledge is now threatened by climate change. Nature-based solutions are being sought worldwide. But once biodiversity is diminished, ecosystem services are compromised and species lost, will we have the know-how to restore nature? Survival depends on it. Human and natural environments are forever connected (**Figure 20**).

2. **Connecting Plants and Animals**: Plants and wildlife have always needed one another to survive. Plant and wildlife sciences connect in the science of ecology which guides decision-making and research about their futures. These linkages are not always well understood or supported by the public or legislators. Action can be slow and species become extinct. Now and then one person ensures a specie's safe passage. Often, it takes a community or act of Congress.

3. **Restoring Native Plants**: As human-made disturbances increase so does the demand for native seed. Lack of availability continues to be an obstacle. After some 40 years of native seed growing successes, the horticulture industry largely ignores this business opportunity (**Figure 21**). Because of climate change pressures, federal land agencies are poised to both collect and grow ecoregional seed themselves and partner with industry in no-risk contracts.

4. **Understanding Restoration**: Although the United States has almost 100 years of restoration history, succeeding without unintended consequences continues to be a challenge. We continue to pioneer with rewilding too. As thousands of acres are restored, the process moves from an art to a science with increased diversity and function. Continued monitoring and managing over time will inform next levels of success, ultimately measured by human survival.

5. **Dealing With Invasive Plant Threats:** Invasive plant threats require more action: increasing public awareness, creating new control tools, stopping terrestrial and aquatics at our borders, and increasing support at the local, state and federal levels. Those are a lot of action words! Because invasives threaten agriculture, the environment, and human health, a rapid response strategy and cooperative efforts make for a front-line defense. A robust rapid response system is needed now. Dealing with minimal funding and lack of public awareness have slowed national successes.

6. **Managing Vegetation**: There is no silver bullet for protecting native plants and habitats from invasives on any given site. Training is critical to identifying both and eliminating only the invaders. We can no longer mow and spray weeds out of existence. Our toolbox remains limited while invasives continue to spread. They do not respect political boundaries so no single group can afford to eliminate their movement. Partnerships are imperative!

7. **Partnering**: Sharing strategies, tool, and crews at local, state. national and even international levels

Figure 20. (from Part One, Chapter 5) Kathy Bolin began searching for native seed in highway rights-of-way on behalf of DNR restoration needs in the 1980. One of her sources, the Shooting Star Prairie on Highway 56 became a Scientific and Natural Area.

Figure 21. (from Part Three, Chapter 29) Ron Bowen was one of the Midwest's pioneers in growing native species. Now his stores attract not only monarchs to Liatris sp., but customers as well.

requires both funding and coordination. Once again, the public and legislators need to understand this need. Sharing information among disciplines and stakeholders at all levels is essential. Pollinator loss has inspired and focused many cooperative efforts. They prove that together we accomplish more.

8. **Taking Action**: None of us wanted to become a "political animal". However, changing the way we protect and manage biodiversity on the ground can take generations of effort and lost time. This section explores how actions of one or more actions made a difference by lobbying, rulemaking, letter writing, coalition building and influencing legislators, brought about change. Sometimes rulemaking or regulation is the only way to change human behavior. And sometimes it is who you know that makes a difference.

9. **Ground-breaking Tools**: On-the-ground as well as electronic tools have advanced our ability to identify and inventory flora and fauna, map, rank and assess them, plus wash away invasive threats. Mexico leads with a big picture mapping view in their hope of protecting biodiversity and conservation usage. The next big step of combining North American databases would clarify priorities, cooperation and long-range planning on a continental level. Last year the TNC's Natureserve developed (with the help of big tech) a map of Biodiversity Importance, a map that should be the basis of all protection and restoration decision-making.

10. **Building on What We Learned**: Actions require multidisciplinary input. Author truths should spur the next generation's innovation, determination and hope for conservation and the greater good. Healing the earth of man-made scars requires responsible effort by the next generation as the climate changes, always with an eye for long-term consequences. Building on what we learned the hard way will save time and money, safeguarding the planet's health. Not only students and practitioners, but environmental advocates can build on what we learned.

MNTaxa Database Changes

by ***Derek Anderson, MN DNR***

These changes have been made to our (available online at: https://www.dnr.state.mn.us/eco/mbs/plant-lists.html). Many, but not all, have also been made to our rare features database (and Rare Species Guide).

Gentianaceae - Gentian Family			
Bartonia virginica	*Bartonia virginica*	yellow screwstem	
Centaurium pulchellum	*Centaurium pulchellum*	branching centaury	
Gentiana affinis	*Gentiana affinis*	northern gentian	
	Gentiana affinis var. affinis	pleated gentian	The only subtaxa known from Minnesota.
Gentiana andrewsii	*Gentiana andrewsii*	bottle gentian	
Gentiana andrewsii var. andrewsii	*Gentiana andrewsii var. andrewsii*	bottle gentian	
Gentiana andrewsii var. dakotica	*Gentiana andrewsii var. dakotica*	bottle gentian	
Gentiana flavida	*Gentiana flavida*	yellowish gentian	
Gentiana puberulenta	*Gentiana puberulenta*	downy gentian	
Gentiana rubricaulis	*Gentiana rubricaulis*	great lakes gentian	
Gentianella amarella	*Gentianella amarella*	northern gentian	
	Gentianella amarella subsp. acuta	marsh gentian	The only subtaxa known from Minnesota.
Gentianella quinquefolia	*Gentianella quinquefolia*	stiff gentian	
Gentianella quinquefolia var. occidentalis	*Gentianella quinquefolia subsp. occidentalis*	stiff gentian	
Gentianopsis crinita	*Gentianopsis crinita*	greater fringed gentian	
Gentianopsis procera	*Gentianopsis virgata*	lesser fringed gentian	
Halenia deflexa	*Halenia deflexa*	northern spurred gentian	
Apocynaceae - Milkweed or Dogbane Family			
Asclepiadaceae	Apocynaceae	Milkweed Family	Phylogenetic analysis supports including Asclepiadaceae (milkweed family) within the Apocynaceae
Apocynum androsaemifolium	*Apocynum androsaemifolium*	spreading dogbane	
Apocynum cannabinum s.s.	*Apocynum cannabinum s.l.*	American hemp	
Apocynum sibiricum	*Apocynum cannabinum s.l.*	American hemp	Now included within *A. cannabinum*.
Apocynum ×floribundum	*Apocynum ×floribundum*	intermediate dogbane	
Asclepias amplexicaulis	*Asclepias amplexicaulis*	clasping milkweed	
Asclepias exaltata	*Asclepias exaltata*	poke milkweed	
Asclepias hirtella	*Asclepias hirtella*	prairie milkweed	
Asclepias incarnata	*Asclepias incarnata*	swamp milkweed	
Asclepias incarnata var. incarnata	*Asclepias incarnata subsp. incarnata*	swamp milkweed	The only subtaxa known from Minnesota.
Asclepias lanuginosa	*Asclepias lanuginosa*	woolly milkweed	
Asclepias ovalifolia	*Asclepias ovalifolia*	oval-leaved milkweed	
Asclepias speciosa	*Asclepias speciosa*	showy milkweed	
Asclepias stenophylla	*Asclepias stenophylla*	narrow-leaved milkweed	
Asclepias sullivantii	*Asclepias sullivantii*	Sullivant's milkweed	
Asclepias syriaca	*Asclepias syriaca*	common milkweed	
Asclepias tuberosa	*Asclepias tuberosa*	butterflyweed	
Asclepias tuberosa var. interior	*Asclepias tuberosa subsp. interior*	butterflyweed	The only subtaxa known from Minnesota.
Asclepias verticillata	*Asclepias verticillata*	whorled milkweed	
Asclepias viridiflora	*Asclepias viridiflora*	green milkweed	
	Cynanchum laeve	honeyvine	Reported in FNA, but currently no specimen available to support evidence of it being in the state.
Vinca minor	*Vinca minor*	common periwinkle	
Vincetoxicum nigrum	*Vincetoxicum nigrum*	black swallow-wort	
Convolvulaceae - Morning glory Family		Morning Glory Family	
Calystegia macounii	*Calystegia macounii*	Macoun's false bindweed	
Calystegia sepium	*Calystegia sepium*	hedge bindweed	
	Calystegia sepium subsp. angulata	hedge bindweed	Work is needed on subtaxa.
	Calystegia sepium subsp. appalachiana	Appalachia false bindweed	Work is needed on subtaxa.
	Calystegia sepium subsp. sepium	hedge bindweed	Work is needed on subtaxa.
Calystegia spithamaea	*Calystegia spithamaea*	upright bindweed	
	Calystegia spithamaea subsp. spithamaea	upright bindweed	Work is needed on subtaxa.
	Calystegia spithamaea subsp. stans	upright bindweed	Work is needed on subtaxa.
	Cuscuta campestris	field dodder	Reported, more work needed on *Cuscuta*
Cuscuta cephalanthi	*Cuscuta cephalanthi*	buttonbush dodder	
Cuscuta coryli	*Cuscuta coryli*	hazel dodder	
Cuscuta glomerata	*Cuscuta glomerata*	rope dodder	
Cuscuta gronovii	*Cuscuta gronovii*	scaldweed	
	Cuscuta gronovii var. gronovii	swamp dodder	Work is needed on subtaxa.
	Cuscuta gronovii var. latiflora	swamp dodder	Syn: *Cuscuta saururi* (specimens verified by expert)
Cuscuta indecora	*Cuscuta indecora*	large-seed dodder	
Cuscuta pentagona	*Cuscuta pentagona*	bur clover dodder	
Cuscuta polygonorum	*Cuscuta polygonorum*	smartweed dodder	
Cuscuta megalocarpa	*Cuscuta umbrosa*	large-fruit dodder	
Ipomoea hederacea	*Ipomoea hederacea*	ivyleaf morning-glory	
Solanaceae - Nightsghade Family			
	Datura innoxia	angel's-trumpet	Noted, but no documented occurrences.
Datura stramonium	*Datura stramonium*	devil's apple	
Datura wrightii	*Datura wrightii*	angel's trumpet	
Leucophysalis grandiflora	*Leucophysalis grandiflora*	dwarf ground cherry	
Lycium barbarum	*Lycium barbarum*	matrimony vine	Noted, but no documented occurrences.
Nicandra physalodes	*Nicandra physalodes*	apple of Peru	Noted, but no documented occurrences.
	Petunia axillaris	large white petunia	Noted, but no documented occurrences.
Petunia ×hybrida	*Petunia ×atkinsiana*	garden petunia	
Physalis pubescens var. grisea	*Physalis grisea*	hairy ground cherry	Noted, but no documented occurrences.
Physalis heterophylla	*Physalis heterophylla*	clammy ground cherry	
	Physalis longifolia	longleaf groundcherry	Recently documented.
	Physalis longifolia var. longifolia	longleaf groundcherry	
	Physalis longifolia var. subglabrata	longleaf groundcherry	Recently documented.
Physalis virginiana	*Physalis virginiana*	Virginia ground cherry	
Solanum carolinense	*Solanum carolinense*	horse nettle	
	Solanum carolinense var. carolinense	Carolina horsenettle	The only subtaxa known from Minnesota.
Solanum dulcamara	*Solanum dulcamara*	bittersweet nightshade	
Solanum nigrum var. virginicum	*Solanum emulans*	black nightshade	Also syn: *Solanum ptycanthum*.
	Solanum nigrum	black nightshade	Solanum nigrum, as described in FNA, was probably introduced from northern Europe and has been locally naturalized in North America. Currently it is not known in Minnesota.
	Solanum nitidibaccatum	hairy nightshade	Noted, but no documented occurrences.
Solanum rostratum	*Solanum rostratum*	buffalo bur	
Solanum triflorum	*Solanum triflorum*	three-flowered nightshade	Noted, but no documented occurrences.

End Photos –Ragged fringed orchid (*Platanthera lacera*; left) and Small purple fringed orchid (*Platantherea psycodes*) observed at Sherburne National Wildlife Refuge (images submitted by Brian Johnson)

Poison Ivy Look-alike Quiz Answers (from p. 14). a) Bramble (*Rubus*); b) Wild strawberry; c) Honewort; d) tick-trefoil; e) Wild sarsaparilla; f) Bladdernut

Minnesota Plant Press

The Minnesota Native Plant Society Newsletter

The Minnesota Native Plant Society – *A non-profit organization dedicated to the conservation and appreciation of Minnesota's native plants and plant communities* through education *and public awareness.*

Volume 40 Number 3 **October 2025**

Eastern Leatherwood: A Humble Yet Hardy Plant

by Kate Cary ***(College of St. Benedict/St. John's University Biology Department)***

Eastern leatherwood (*Dirca palustris*) is, at first glance, an unassuming shrub nearly indistinguishable from its neighbors. However, it is actually a plant with a clever strategy that allows it to thrive in forest understories. Plus, it is surprisingly easy to identify, once you know a few tricks. In fact, I like to focus on eastern leatherwood for my first lab in my Plant Systematics class because it showcases the power of noticing a few key attributes of leaves.

In technical terms, eastern leatherwood has alternate, obovate, and entire leaves that are glabrous when mature (**Figure 1**). If you're already familiar with botanical keys and plant identification guides, that may be all you need to know, but if not—no fear! Each term has a simple definition. "Alternate" means that the leaves connect one-by-one to the stem, on alternating sides (as opposed to opposite leaves, where two leaves emerge from the same point on the stem). "Obovate" means that the leaves are generally egg-shaped, but the widest point of the leaf is closer to the tip of the leaf than the base. "Entire" leaves have smooth margins, and "glabrous" means that the leaf surface is smooth instead of hairy. All together, these descriptive words can help you focus in on the key attributes that help set eastern leatherwood apart from its fellow leafy green neighbors.

Figure 1. Photograph of eastern leatherwood leaves, showcasing its alternate, obovate, and entire leaves that are glabrous at maturity. Image courtesy Kate Cary.

Plus, once you've looked at the plant closely enough to be sure it isn't

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poison ivy, you can do one final check to see if it is eastern leatherwood: bend its stems. Eastern leather-wood has shockingly flexible stems, and it is easy to see how it earned its name as "leatherwood," given that leather is a flexible but strong material, similar to the bark and stems of this plant. Researchers have figured out why eastern leatherwood's stems are so pliable: they are low in a chemical called lignin (Mottiar et al., 2020), which helps make wood more stiff and sturdy.

A couple years ago, two of my students, Anna Cole and Kayla Rigdon, as well as Dr. Gordon Brown and I, set out to discover how eastern leatherwood's low lignin and bendy stems affect its ability to withstand environmental stressors. When we examined eastern leatherwood on campus and across northern Minnesota, we found that many of the plants had twigs, branches, or even full-sized trunks that had fallen onto them. Falling plant debris can be a substantial hazard, especially in high winds—that's why you should always check for dead trees or branches above you when setting up your tent for camping. Eastern leatherwood can't get up and move like a camper can, though. Instead, its flexible branches simply bend around fallen trees (**Figure 2**) and rolled-over trunks (**Figure 3**). Of the 239 eastern leatherwood shrubs we found that had fallen plant debris on them, only one showed any sign of damage (a branch broke off due to a full-sized tree falling on it). So, our data support the conclusion that eastern leatherwood's pliable branches help it survive undamaged when other plants fall on it.

However, we knew that there is one major potential downside to having low-lignin, bendy branches: increased vulnerability to water stress. The lignin that makes stems stiff also makes the individual cells within the wood stiffer, helping them to continue functioning while water stress increases. We worried that eastern leatherwood's bendy strategy might make it vulnerable to drought, so we used a method called a "bench dry" to figure out how resistant its stems are to water stress. Essentially, we let stems dry out to varying levels while sitting out on the lab bench (hence the name, "bench dry"). Then, we took these stems and used tubing and gravity to try to push water through them. Stems that were damaged by the water stress couldn't transport as much water, and the more water stress they experienced, the less water they were able to transport. In nature, this loss of water movement can be deadly, because leaves rely on the stems continuing to supply water to them. We were relieved to find that eastern leatherwood is able to keep its wood functional at levels of water stress quite a bit higher than we measured on campus throughout the summer, likely because it keeps its water-conducting cells small and sturdy (Cole et al., 2023). While I would still worry about eastern leatherwood during moderate to severe droughts, it isn't nearly as vulnerable as I thought it would be based on its wood composition.

Every year when our graduating biology majors list their favorite organisms during our senior brunch, usually one or two of them name eastern leatherwood, and I quite agree with them. It may be a shrub that is easy to walk by without noticing, but its bendy and surprisingly drought-resistant stems allow it to thrive in the forest understory, even when much larger plants take a tumble.

Figure 2. A large eastern leatherwood stem (emerging from the right-hand side of the foreground, with smooth but lightly speckled bark) bends around a partly fallen dead tree (the trunk with rough bark that is beginning to flake off). Image courtesy Kate Cary.

Figure 3. A forked eastern leatherwood stem curves around a large, cut trunk that had rolled partly on top of it. Image courtesy of Kate Cary.

References:

- Cole, A., Rigdon, K. M., Brown, D. G., & Cary, K. L. (2023). Ecophysiological implications of low lignin in eastern leatherwood (*Dirca palustris* L.). ***The Journal of the Torrey Botanical Society***, https://doi.org/ 0.3159/TORREY-D-22-00014.1.

- Mottiar, Y., Gierlinger, N., Jeremic, D., Master, E. R., & Mansfield, S. D. (2020). Atypical lignification in eastern leatherwood (*Dirca palustris*). ***New Phytologist***, 226(3), 704-713. https://doi.org/10.1111/nph.16394

Preserving Central Minnesota's Botanical Legacy: the St. Cloud State University Herbarium

by Angela McDonnell *(St. Cloud State University)*

Nestled on the campus of St. Cloud State University, within the Wick Science Building, on the second floor, and amongst Biology offices and classrooms, the SCSU Herbarium is a quiet and growing hub of botanical information, research, and education. This fall, we are celebrating the addition of the 20,000th accessioned specimen to the collection (**Fig. 4**) and through courses such as Field Botany, sets of exchanged specimens between herbaria, and ongoing research projects, the collection is poised to grow in the coming years. Because most of the specimens are from central Minnesota, the collection itself is an archive is a vital resource for understanding the plants of the region (**Fig. 5**).

The herbarium was founded sometime in the late 19th century and includes specimens dating back to the 1880's, shortly after the time the city of St. Cloud was established in 1856. The oldest specimens include a historical contribution from the Reverend E.V. Campbell. Other important contributions have been made over the years by Dr. Lester Lindstrom, Dr. Max Partch, Dr. Gerald Wheeler, and many other SCSU faculty, students, and collaborators. Each specimen is more than just a dried plant; these are snapshots (sometimes blurry, sometimes very clear) of botanical and ecological history. Each specimen is accompanied by details including information about the locality or site on which it was collected, the name of collector and their notes, the date, and often some information about the reason it was collected. Altogether, the collection forms a detailed picture of Minnesota's botanical past and present.

Figure 4. The 20,000th specimen accessioned at the SCSU herbarium is ostrich fern (Matteuccia struthiopteris var. pensylvanica) collected during the Field Botany course in the fall of 2024. Follow us on Instagram to hear more about our upcoming celebration of this milestone. Image courtesy Angela McDonnell.

The herbarium itself supports a wide range of scientific inquiry, from floristics and taxonomy to phenology and climate change research. Data held within the cabinets will undoubtedly play a critical role in documenting shifts in plant distributions over time, the spread of invasive species, and the

status of rare plants. As such, it is an indispensable tool for conservationists, ecologists, and educators alike.

Under our stewardship, the herbarium has been experiencing a renovation of sorts. In preparation for digitization, student curators have applied unique barcodes to each specimen. We are in the early stages of capturing high-resolution images (**Fig. 6**) which will eventually make the collection accessible through platforms like the *Minnesota Biodiversity Atlas*. Our work not only preserves fragile specimens but also democratizes access to data, enabling anyone to explore the troves of information that have been and are still available only to in-person visitors.

The herbarium is a training ground for students and future botanists of all kinds. Students gain hands-on experience in specimen curation and care, data management, field collection, and museum management, which fosters a deeper appreciation for native plants and history. As of last year, there are more than 3,500 registered active herbaria in the world. There is little doubt that some answers to our biodiversity crises lie in the hands of people adept in analyzing data from museums, including herbaria.

You can follow the SCSU herbarium on Instagram (@scl_herbarium) to receive updates on our projects and progress. The herbarium has a backlog of thousands of specimens to add to the cabinets, just waiting to be processed and filed. If you are local to the St. Cloud area, passionate about plants, biodiversity, or conservation, and want to learn about helping us with various curatorial tasks, your time can make a meaningful impact. To get involved, contact Angela McDonnell at angela.mcdonnell@stcloudstate.edu. In a time of rapid environmental change, herbaria such as ours can remind us of the importance of preserving and studying our local natural world, one specimen at a time.

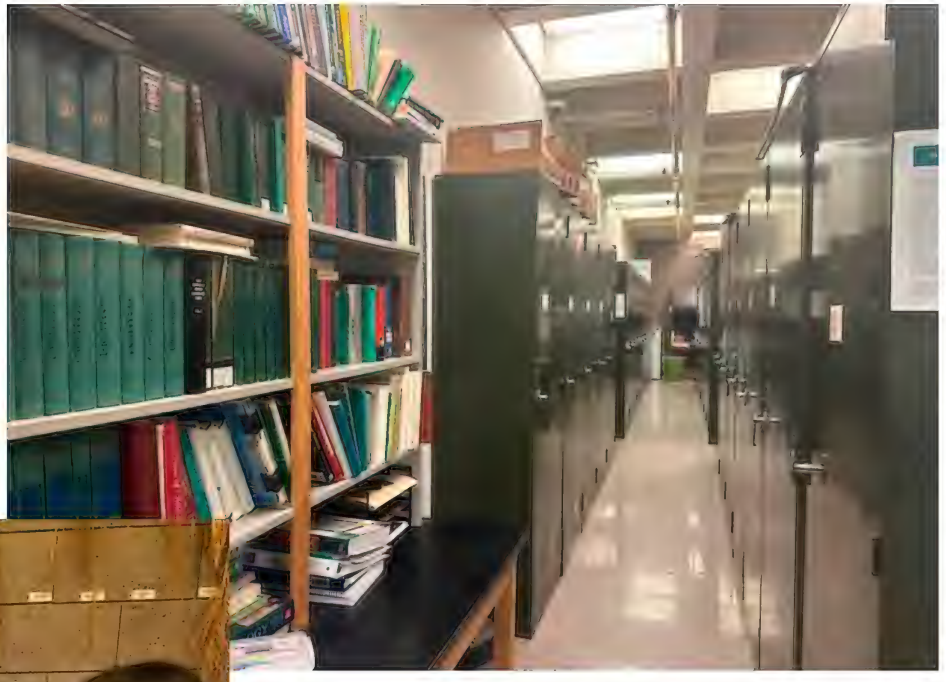


Figure 5. (right) This photo shows one side of the herbarium, with rows of cabinets that contain most of the collection and part of the botanical library. The other side of the herbarium features work spaces, cabinets of specimens that are being processed, and additional cabinets that contain the rest of the collection. Image courtesy Angela McDonnell.

Figure 6. (left) Students at our current digitization station work on adjusting settings to capture an image. Image courtesy Angela McDonnell.

Minnesota Wildflowers Plant of the Month: *Rubus ithacanus*

by ***Katy Chayka, MN Wildflowers (www.mnwildflowers.org)***

Family: Rosaceae (rose)
Common names: Ithaca blackberry, Ithaca dewberry
Life cycle Perennial
Plant height: 1 to 4 feet (*before arching over*)
Bloom season: June
Habitat: Sun to shade; dry to moist sandy soil; open woods, woodland edges, savanna

Plant Description

Flowers: Clusters of 5 to 15+ flowers on lateral shoots along 1-year-old stems, the cluster shape variable, sometimes a single raceme at the tip of the shoot, sometimes ascendate with single flowers or small clusters from leafy nodes below the terminal cluster, rarely in a flattish/convex cluster (corymb). Flowers are white, 1 to ~1½ inches (2.5 to 4 cm) across with 5 rounded petals. In the center is a green cluster of many styles surrounded by a ring of numerous, creamy white-tipped stamens.

Cupping the flower are 5 green sepals, mostly triangular, the tip typically abruptly narrowed with a tail-like extension, the outer surface moderately to densely covered in a mix of glandular and non-glandular hairs. Flower stalks are similarly hairy, and sometimes have a few needle-like prickles.

Leaves and stem: Leaves are alternate and palmately compound, the non-flowering first-year stems (primocanes) with 5 leaflets or sometimes 3 on the lower stem, the flowering second-year stems (floricanes) with mostly 3 leaflets. Leaflets are elliptic to egg-shaped, sharply toothed or double-toothed around the edges, sparsely hairy on the upper surface, moderately to velvety hairy on the lower. The terminal leaflet on primocanes is 3 to 5½ inches (8 to 14 cm) long, up to 3½ inches (6 to 9 cm) wide, widest at the middle or towards the base, rounded to slightly heart-shaped at the base, abruptly tapered to an extended or tail-like tip. Leaflet stalks are variably covered in a mix of glandular and non-glandular hairs, and scattered broad-based, curved prickles. At the base of the compound leaf stalk is a pair of linear to lance-linear appendages (stipules).

Prickles are up to about ¼ inch (2 to 5 mm) long, broad-based, straight to slightly curved, very strong and sharp, and sparsely to moderately abundant but unevenly spaced along the stem. Primocanes usually have at least a few glandular hairs scattered along the stem, sometimes just near the tip. Stems are up to 9 feet (to 3 m) long, green to dark red or purple, initially erect, soon arching over and the tips trailing along the ground. Arching stems tend to fall over each other and form a dense, tangled mound, and some trailing stems will take root at the tip. Stems die the second year after fruit matures. Colonies may form from root suckering and tip-rooting.

Fruit: Fruit is a round to short-cylindric cluster of fleshy drupelets, up to about ½ inch (8 to 15 mm) long, maturing from green to red to black, and are quite tasty.

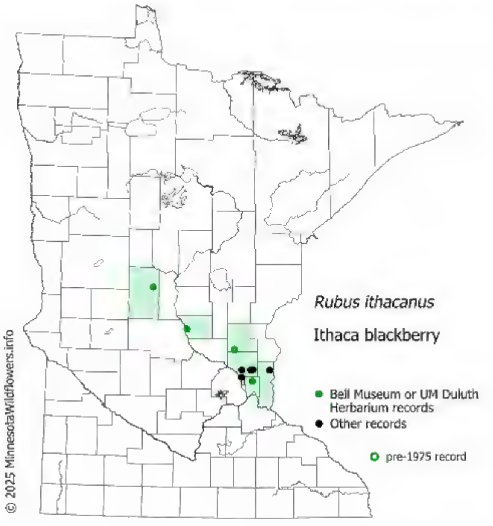
Notes

Rubus ithacanus is uncommon in Minnesota, where it reaches the northwestern tip of its range. Not a lot is known about its history here, except it appears to have a preference for sandy soil and habitats where it can get at least some sun, rather than constant shade. In Minnesota, it's mostly been found in or near woodlands dominated by oaks.

It is identified by the combination of: glandular hairs on sepals and flower stalks, usually some also on primocane stems and leaf stalks; prickles are broad-based, straight to slightly curved, 2 to 5 mm long, very strong and painful(!); lower leaf surface is usually velvety hairy; the flower cluster is variable in shape (raceme or ascendate, rarely a corymb) with 5 to 15+ flowers. Primocane leaves mostly have 5 leaflets, the terminal leaflet elliptic to egg-shaped, its base rounded to somewhat heart-shaped. Canes can reach 9 feet in length but arch over anywhere between ankle and waist height, resulting in a tangled, mounding colony, the tips usually trailing along the ground, some canes rooting at the tip.

The tip-rooting technically makes this species a Dewberry rather than a Blackberry. When trailing canes and tip-rooting are not obvious (as is the case earlier in the season), the glandular hairs and broad-based prickles could easily confuse this with one of the High-bush Blackberries, *R. allegheniensis* in particular (someone once described *R. ithacanus* as looking like *R. allegheniensis* that's been knocked to the ground), but the latter typically grows taller before arching over, its flower/fruit cluster is consistently a narrow raceme, and of course its canes do not trail along the ground or tip-root.

In many references *R. ithacanus* is lumped with *Rubus flagellaris*, along with other MN species *R. ferrofluvius*, *R. heterophyllus*, *R. multifer*, *R. satis*, and *R. steelei*, but we follow the treatments by Mark Widrlechner and documented by Welby Smith in his book "*Trees and Shrubs of Minnesota*", which keeps them split as separate species. *R. flagellaris* is apparently a dumping ground for dewberries that have broad-based prickles and stems that trail along the ground, rooting at the tips, but other characteristics can be rather variable. Most similar from this group is *R. satis*. Both have velvety leaves, but *R. satis* has



smaller, less numerous (and less painful) prickles, lacks any glandular hairs, and its flower/fruit clusters are smaller and more compact, usually a flattish/convex cluster (corymb). I've also observed the *R. satis* leaflet stalks are typically quite short and leaflets seem to be more irregularly toothed compared to *R. ithacanus*, though that isn't noted in any references and may not be consistent characteristics.

Image Credits

- Photos by Katy Chayka taken in Anoka County.
- Minnesota county distribution map ©Minnesota Wildflowers Information.
- More images available at https://www.minnesotawildflowers.info/shrub/ithaca-blackberry

Notes from the Herbarium

by Tim Whitfeld *(Collections Manager of the Bell Museum Herbarium at the University of Minnesota)*

As of September 2025, the Bell Museum Herbarium has 207,127 specimens collected in Minnesota. These specimens represent at least 1,941 taxa (species, subspecies, and varieties) that are considered native to the State and 433 that have been introduced following European Settlement.

To put this level of diversity into perspective, the most botanically diverse state, California, has 5,418 native taxa (according to NatureServe) and the least diverse (North Dakota) has 1,201. Much of this range is accounted for by the size of the state. However, that's not the only explanation. For example, Alaska, the largest State, has one of the lowest species tallies (1,354). Clearly, latitude and climate are also important factors in determining species diversity because not many plants can tolerate very cold winter temperatures.

Diversity of habitats is also vital. In addition to a generally temperate climate, California has mountains, deserts, coastal, and forest habitats. This means more opportunities for a wider range of plants to grow and thrive. Minnesota also has a good range of habitats (prairie, deciduous forest, coniferous forests, lakes, and plenty of wetlands) so we end up with more plant species than our latitude might predict. It's often assumed that Hawaii might be the most diverse state because of its tropical climate. However, it is small and geographically isolated so not many plants have even made it there. As a result, it sits just one place above North Dakota in the rankings with 1,249 native species.

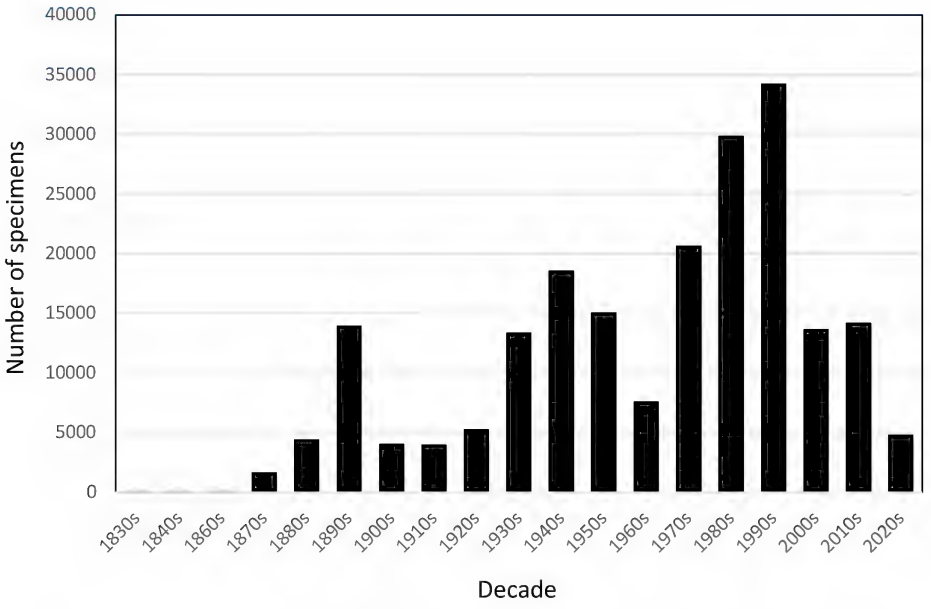


Figure 7. Number of specimens in the Bell Museum Herbarium by decade. Image courtesy Tim Whitfeld.

Returning to the specimens at the Bell Herbarium: our oldest Minnesota specimen was collected in 1832 and the most recent was in 2025. **Figure 7** shows the number of specimens in the Bell Museum Herbarium by decade. Interestingly, we have a fairly consistent representation of collections through the decades (with peaks and valleys) and plenty of specimens from the late 20th and early 21st centuries. This is important for comparing past and present patterns of diversity and also for assessing environmental change. For this, we can thank the Minnesota Department of Natural Resources and, in particular, the ongoing efforts of the many botanists and ecologists working for the Minnesota Biological Survey.

The Survey started in the 1980s and a peak in collections at that time is clear on the graph. Many other herbarium collections lack representation from recent decades, which hampers their ability to compare past and present diversity and understand local botanical and ecological change.

In addition to the relatively consistent temporal coverage, the Bell Museum's Minnesota collection includes the entire state and **Figure 8** shows the number of specimens per county, with darker colors representing higher numbers.

It's clear that the number of specimens in a county is partly a result of the size of the county (note, Saint Louis County) but there's also a geographic bias. The Metro area (smaller counties but home base for many botanists) has a disproportionally high number of specimens. The Arrowhead region and the southeastern part of the State are also heavily collected because these are known hotspots that botanists have targeted over the years. This "collection bias" is an important factor when using specimens to assess levels of biodiversity.

Botanical collectors tend to favor charismatic wildflowers over hard-to-identify grasses and sedges. They're also inclined to collect in more accessible areas close to roads, trails, and the comforts of home. As a result, there tends to be more specimens from these taxonomic groups and areas. More specimens nearly always lead to more species being represented so these biases must be taken into account when comparing biodiversity from one region to another. Interestingly, if we plotted a map of Minnesota with the number of species per county, it would look almost identical to the map of specimens per county. Again, more specimens equal more species!

We continue to collect specimens to fill in gaps and balance past biases. It's hard (but exciting) to get off the beaten path and collect uncharismatic and hard to identify sedges or grasses. But we do our best because it's important all species (not just the showy ones) and all regions (not just the accessible areas) are well represented in our collection. Over the coming years, we'll continue to boost our Minnesota collections to ensure we're providing data from the early 21st century for future researchers and to continue the legacy of past collectors over the past two centuries.

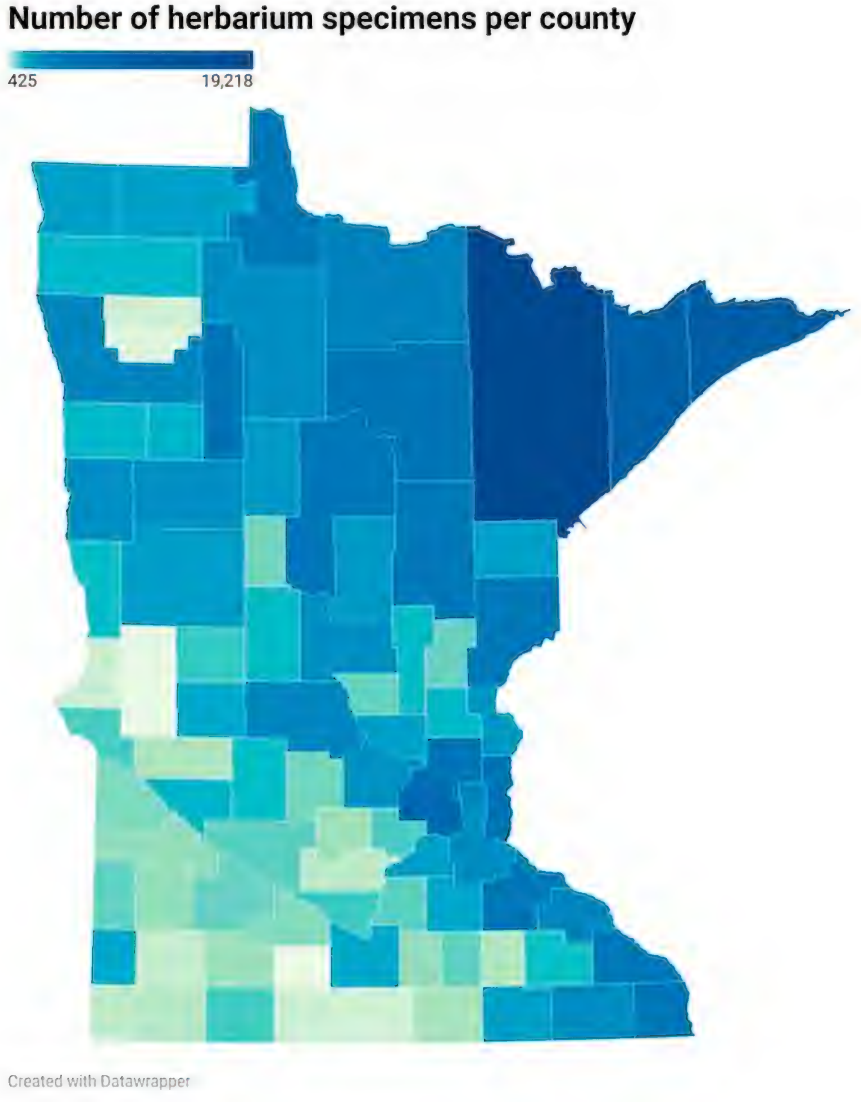


Figure 8. Number of specimens in the Bell Museum by Minnesota county. Image courtesy Tim Whitfeld.

Destination Botany: SNAs A-Z

*by **Kelly Randall** (Statewide Outreach Consultant, Scientific and Natural Areas Unit, MN DNR)*

Occasionally I am asked "What it your favorite Scientific and Natural Area (SNA)?", which is a difficult question for me to answer. I have been to almost all Minnesota's 170 SNAs in my 30+ year career with the Department of Natural Resources. Each has its own story and reason why it could be a favorite. Ok, maybe some more so than others.

When asked to write this Destination Botany story that question reared-up in my mind again. Should I try to pick a "favorite" SNA? How do I choose one site to recommend?

I decided to go outside the box and choose SNAs from A to Z, or more precisely A and Z: Agassiz Dunes and Zumbro Falls Woods SNAs. And yes, like a doting parent with more than one child—you might have guessed this would happen—I couldn't choose just one!

A final note before I dig into these sites. I consider myself better suited for a story on Destination Photography, rather than botany. My knowledge of Minnesota's native plants comes from some formal biology training, but mostly a great love of plants. I am by no means an expert. Okay, now on to the destinations.

Figure 10. Bur oak at Agassiz Dunes SNA. Image courtesy Kelly Randall.

First up is Agassiz Dunes SNA. This natural area straddles Norman and Polk County in the northwestern region of the state. The complete picture of protected lands here goes beyond the SNA's 458 acres. An adjacent DNR Native Prairie Bank conservation easement on private land and a Nature Conservancy registry site more than doubles that figure. Another 640 neighboring acres is owned and managed by the City of Fertile as the Agassiz Environmental Learning Center. All that is to say there is a very large complex of interwoven native plant communities here worth visiting, from dry sand prairie to dry barrens oak savanna to bur oak-aspen forest.

Figure 9. Creeping juniper (left) and green milkweed at Agassiz Dunes SNA. Image courtesy Kelly Randall.

What caught my photographer's eye in exploring Agassiz Dunes SNA? Firstly, the gnarly open-grown bur oak (*Quercus macrocarpa*; **Fig 10**), then the creeping juniper (*Juniperus horizontalis*) which is a species of special concern in Minnesota (**Fig 9**.). Summertime eye-catching color comes in shades of wood lily (*Lilium philadelphicum*), narrow-leaved puccoon (*Litho-spermum incisum*) green milkweed (*Asclepias viridiflora*), slender beard tongue (*Penstemon gracilis*) and harebell (*Campanula rotundifolia*). For a curious botanist

the complete plant list gives a full spectrum of the species you may find, including the rare and interesting.

On to Zumbro Falls Woods SNA! Find this "favorite" in the blufflands of southeastern Minnesota next to the town of Zumbro Falls. Like Agassiz Dunes, this SNA is a straddler too, but it's the Zumbro River that passes through the heart of this SNA. Along the river sheer cliffs expose the bedrock of sandstone/dolomite. This bedrock also forms the hilly topography that supports southern mesic hardwood forest here.

These types of forests call to me in spring to photograph the swaths of ephemerals blooming in all their glory. You can find all those you might expect to see at Zumbro Falls Woods SNA; Jack-in-the-pulpit (*Arisaema triphyllum*), wild ginger (*Asarum canadense*), dutchman's breeches (*Dicentra cucullaria*; **Fig. 12**), wild geranium (*Geranium maculatum*), Virginia bluebells (*Mertensia virginica*; **Fig. 11**), bloodroot (*Sanguinaria canadensis*) and large-flowered trillium (*Trillium grandiflorum*) among others.

Figure 11. Jeweled shooting star (left) and Virginia bluebells at Zumbro Woods SNA. Photos © John Gregor/ColdSnap Photography.

Figure 12. Wild geranium (left) and Dutchman's breeches at Zumbro Falls Woods SNA. Photos © John Gregor/ColdSnap Photography.

For a botany buff the lure may likely be jeweled shooting star (*Dodecatheon amethystinum*; **Fig 11**). DNR monitors it as a watchlist species because of its limited geographic range. Yet, here too you'll find a full range of species to explore.

From A-Z there is an SNA destination worthy of a visit for botanists and photographers alike. I hope you find the opportunity to explore your favorite SNA, or somewhere that becomes a favorite. Maybe you have, or will come to have, the difficult task of trying to pick just one. ;)

A Chicken Korma Situation

*by **Stephen Saupe** (MN Native Plant Society, newsletter co-editor)*

"We've got a chicken korma situation," our daughter Erin said as she peeked into Elodie's diaper.

We knew what she meant. Our granddaughter's diaper was overflowing with a creamy, yellowish, chunky paste. It looked just like one of our family's favorite dishes, chicken korma (**Figure 13**).

Perhaps the biggest difference was that Elodie's diaper didn't have the lovely curry aroma you might expect. In fact, there was very little odor at all.

If you have ever had the opportunity to change the diaper of a newborn, you probably noticed the "chicken korma situation," too. Breast-fed infants have rather innocuous diapers, without many solids or odor, that look like this delicious South Asian dish.

This "situation" doesn't last long. As a baby gets older and her diet becomes more varied, the contents of a diaper also change. Now that Elodie has begun solid foods, the "chicken korma situations" have evolved into "beef stew poo-nami's." The advent of solids brings with it nastier diapers with more volume, chunks, and odor.

Figure 13. The author's daughter Erin, and son-in-law James, show Elodie a bowl of chicken korma. Image courtesy Steve Saupe.

Why the change? The simple, or at least simplistic, answer is that an infant initially eats like a plant, but then switches to more animalistic ways. To explain, I'll use an analogy.

When I was a kid, dinnertime at my house was a little like a military mess hall. My dad, who served in the Pacific theater during WWII, adhered to the Marine Corps motto, "take all you want, but eat all you take." This resulted in some squabbles during mealtime, but it also meant that there were no leftovers.

Animals are like a naughty kid at the table who takes more than she can eat. Their food typically includes an assortment of bits – like hair, bone, nails, lignified plant cells – that are indigestible. Animals aren't able to use and digest all they ingest.

As a consequence, animals have a lot of wastes and needed to evolve a digestive tract. The massive amount of waste materials can't be internally stored because it would severely restrict motility, which is required for among other things, to gather food.

From one perspective you can consider an animal driven by its gut and the need to fill it up and get rid

of the excess. One of my favorite quotes comes from Professor Wayne Becker (University of Wisconsin, Madison) who wrote that animals can be viewed "as nothing more than a group of cells clustered around a gastro-intestinal tract, differentiated for and dedicated to the task of keeping that gut full."

In contrast, plants are the good kids at the table. Plants only take up from the environment what they need (carbon dioxide, water, some minerals) and use it to make sugars. Like a good Marine, they take what they need and use what they take.

That's not to say that plants have no wastes. Plants make an assortment of metabolic byproducts.

For example, oxygen is a waste product of photosynthesis. It is 'excreted' from the plant by simply allowing it to diffuse into the air through pores in the leaf (stomata). An assortment of volatiles and other molecules are similarly released into the environment from the leaves, as well as from the roots.

Other wastes, including toxins and secondary metabolites, are in low enough concentration that they can be stored in the central vacuole. This subcellular structure is found in most all plant cells. It is a fluid-filled, membrane sac that makes up about 90% of the cell volume. I think of them like a water balloon that occurs within the plant cell (**Fig. 14**).

The storage of water-soluble wastes in the central vacuole has resulted in some people calling them the cesspool of the cell. Though true, it suggests that the central vacuole is basically just a garbage dump – which is not true. These structures have many other functions and have a vital role in pH regulation, cell growth, and intracellular transport.

Figure 13. Photograph of a plant cell model. Note the large central vacuole. The cell cytoplasm essentially forms a thin coating around the vacuole. The cell membrane is painted yellow. To the outside of the membrane is the plant cell wall, which is a matrix of assorted molecules including cellulose, pectic polysaccharides, and some protein. The wall serves many roles such as providing support and mechanical strength. As an aside, it has been speculated that the cell wall may have initially evolved as a means to store excess (waste) carbohydrates. Rather than discard the carbohydrates, they were exported out of the cell and used to build the cell wall – a rather brilliant example of turning "straw" into gold.

To summarize, plants release their relatively limited volume of wastes directly into the environment or store them within the cell. Plants, like a US Marine who leaves a clean plate after dinner, have limited wastes and never faced the evolutionary pressure to evolve an excretory system.

Now, back to diapers.

Consider an infant's first food – breast milk. It is comprised largely

of water, lactose, whey (a mixture of soluble proteins including antibodies), casein, fats (mostly triglycerides), vitamins and minerals. Breast milk is an energy-efficient, wonderfully nutritious, and highly digestible food source. As a result, little waste remains after digestion and breast-fed infant diapers fill with a benign chicken korma-like residue.

As we incorporate apple sauce, broccoli, and other solid foods into a baby's diet, the amount of waste increases proportionately. Factor in the development of gut microbiota to help with digestion, and diaper residues become more like beef stew, and not surprisingly, much less pleasant to change.

My Dad, who passed on several years ago, would not have been happy to know that humans and other animals, at their basic level, are disobedient Marines. However, at least he wouldn't have balked too much at changing his great granddaughter's newborn diapers. A chicken korma situation is heaps better than a beef stew poo-nami.

News from *The Plant Press* Vaults

by ***Brian Johnson*** *(MN Native Plant Society, newsletter co-editor)*

Editors' note*- This represents a new series of articles for The Plant Press. We will attempt to summarize important events from newsletters of the past, aiming to examine those that are having decade anniversaries. However, there are gaps in publication so that may not always be possible. To read the complete stories, please see the archive of past newsletters on the Minnesota Native Plant Society website: https://mnnps.org/newsletters/.*

Fall 1985

At the May 1985 meeting, MN NPS members were notified that a population of dwarf trout lilies has been destroyed at Nerstrand Woods State Park. Though details were not clearly laid out, this seemed to involve a bulldozing incident carried out by park personnel as part of an improvement project. NPS members responded with calls and letters to the DNR and other authorities. After some back-and-forth between the NPS and the DNR, we ultimately learned through the media that the park manager received a three-day suspension without pay. The author of this story noted that we received assurances that action will be taken to further safeguard the population and that the efforts of the Native Plant Society to protect this plant had some effect.

An upcoming fall seed exchange for MN NPS members was announced. This October event took place on the St. Paul campus of the U of MN. The article went on to suggest the best methods for collecting and storing seeds for this event.

Fall 1995

In an editorial, Thor Kommedahl noted that the US Supreme Court had ruled in June that altering an endangered species habitat had the same effect as harming the species. Thus, such damage can be prohibited by the Endangered Species Act. This was taken as a victory for environmentalists but it was noted that the ESA had not been reauthorized by Congress. Critics of the ESA noted that after the recent eruption of Mount St. Helens life had returned to the ash-filled slopes in as little as four years.

This issue included a compilation of websites that contained information about native plants. It was suggested that members try them "if you have access to the world wide web."

Fall 2005

The lead story discussed the relationship between the lupine (*Lupinus perennis*) and the endangered Karner Blue butterfly. The wild lupine is the only plant eaten by caterpillars of the butterfly, and Minnesota is on the western edge of the butterfly's range. Currently (in 2005) there are two populations in the state, both in the Whitewater WMA in southeastern Minnesota. Formerly there was a population at Cedar Creek in Anoka County, but a bulldozer scraped off the lupine population during a road improvement project. This population vanished in the 1980's. Conservation efforts in Minnesota began in the 90's, primarily through recreating Karner Blue habitat in oak savannas and pine barrens. (Editors' note--according to the DNR's rare species guide, the Karner Blue has likely been extirpated from Minnesota.)

The newsletter noted that a plant identification system on CD ROM is available at a discount to MN NPS members. The tool could be used to identify plants through any of several characteristics.

MN PlantWatch Grows Like a Weed

*by **Deanna Leigh** (MN DNR)*

In 2023 when I first started as Community Science Coordinator for the Minnesota Biological Survey, I knew my responsibilities would include recruiting and retaining volunteers for the newly minted MN PlantWatch program (**Fig. 14**). I imagined my winters would be spent traveling throughout the state, attending conferences, visiting colleges and the like, to promote the program and win people over to the obscure world of rare plants. I thought that recruiting enough people to support a viable volunteer program would be one of my biggest challenges. As it turns out, I was completely mistaken. In our first season, we worked with 19 volunteers. In 2024, that number increased to 66 and this past summer, we pushed the envelope to 117 trained volunteers (**Fig's. 16** & **17**). In March when registration for our 2025 field trainings went live, the 50 available spots filled up in *18 minutes*. My visions of winter travels? They were the part of the program that wasn't viable. Kudos to Minnesotans (and a few Cheeseheads!), you express an undeniable devotion to rare native plants. I am continually inspired by the collective knowledge and passion that is shared amongst our community members.

For anyone unfamiliar with MN PlantWatch, it is a cooperative program run by the Minnesota DNR and the University of Minnesota Landscape Arboretum and funded by the Environment and Natural Resources Trust Fund. We train volunteers to search and survey for rare plants throughout the state (**Fig. 15**) and to collect seed for conservation seed-banking (**Fig. 18**). This type of volunteer work is often called community science or participatory science, where people from all walks of life are encouraged to take part in real-world data collection and scientific inquiry. In a time when many organizations struggle to retain volunteers, it has been an absolute privilege to see the genuine interest from the public and to watch our numbers grow.

Figure 14. A rare sighting of all four MN PlantWatch staff together as they search for the even rarer Malaxis paludosa, bog adder's mouth in Cass County. From left to right: Angie Miner (UMLA Conservation Botanist), Malcolm MacFarlane (UMLA Field Botanist), Deanna Leigh (DNR Community Science Coordinator, and Ann Schacher (MN PLantWatch Assistant with the Conservation Corps of Minnesota and Iowa. Image courtesy Deanna Leigh.

Figure 15. PlantWatch volunteers practice flagging and counting plants during field training at Jay Cooke State Park, May 2025. Image courtesy Deanna Leigh.

In 2025, we visited more than 60 sites, documented over 29,000 plants and enjoyed countless hours outdoors honing our botany skills. We may be entering the season of apparent dormancy, but just like plants, our work continues behind the scenes to ensure our growth into the future.

Figure 16. (left) Newly trained volunteers pose at Springbrook Nature Center, May 2025. Image courtesy Deanna Leigh.

Figure 17. (right) Volunteers take lunch under old-growth white cedars while searching for Pyrola minor, small shinleaf, in Carlton County, July 2025. Image courtesy Deanna Leigh.

Figure 18. (from left) Newsletter co-editors Steve Saupe & Brian Johnson join Kristina Bloomquist on a seed collecting expedition. Image courtesy S. Saupe.

MINNESOTA NATIVE PLANT SOCIETY
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